

RocketStor 6424TS

User Manual

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HighPoint Technologies, Inc.

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FCC Part 15 Class B Radio Frequency Interference statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Union Compliance Statement

This Information Technologies Equipment has been tested and found to comply with the following European directives:

- European Standard EN55022 (1998) Class B
- European Standard EN55024 (1998)

Table of Contents

Product Overview	6
Kit Contents.....	6
Section 1: Hardware Installation.....	8
Preparing the Enclosure	8
Preparing the HBA (Host Bus Adapter).....	8
Connecting the HBA with the Enclosure.....	9
LED Activity	10
Section 2: Drivers	12
Installing Drivers on an Existing Operating System	12
Checking your Driver Installation.....	18
Loading Drivers onto a Bootable Array.....	19
Updating the Drivers.....	20
Uninstalling the Drivers.....	21
Section 3: Navigating RocketRAID 2744 BIOS Utility (PC only).....	22
Table 1. Summary of BIOS options	23
Create.....	23
Delete	24
Add/Remove Spare	25
Settings.....	25
View.....	26
Initialize	26
Section 4: BIOS/Firmware Updates	27
Using the WebGUI to update BIOS/Firmware	27
Using a Bootable USB to update BIOS/Firmware	28
Section 5: Navigating the HighPoint WebGUI.....	30
Installing HighPoint WebGUI.....	31
How to Login HighPoint WebGUI.....	33
Global Tab.....	35
Viewing HBA Properties.....	35
Viewing Storage Properties	36
Physical Tab.....	36

Updating BIOS/Firmware.....	37
Obtaining Physical Device Information.....	38
Logical Tab.....	39
Creating an Array.....	40
Adding Spare Disks.....	44
Obtaining Logical Device Information.....	44
Normal Status.....	45
Critical Status.....	46
Disabled Status.....	46
Expanding an Existing Array	47
Setting Tab.....	50
System Settings.....	51
Password Setting	52
Changing your WebGUI password.....	52
Recovering your WebGUI password	52
Email Setting.....	52
Recover Tab.....	54
How to Backup your Recover List.....	55
How to Reload your Backup Recover List.....	55
Event Tab	55
Table 3. Event Log Icon Guide	56
SHI (Storage Health Inspector)	56
How to Enable SMART Monitoring	57
How to Change HDD Temperature Threshold	58
How to Use the Health Inspector Scheduler	58
How to Create a New Verify Task.....	59
Section 6: Formatting the RAID Volumes	59
Section 7: Troubleshooting.....	64
Handling Critical Arrays.....	64
Rebuilding Stops Due to Bad Sectors	65
Critical array becomes disabled when you removed faulty disk	65
Handling Disabled Arrays	65

Your PC hangs when card is installed.....	66
Help	67
Table 4. WebGUI Icon Guide	68
Table 5. RAID Level Quick Reference	70
HighPoint Recommended List of Hard Drives.....	71
Contacting Technical Support.....	71

Product Overview

The RocketStor 6424TS bundle package includes a enclosure for housing your physical drives and a RAID Controller to manage and create RAID arrays of different levels.

- NetStor 3U-16 Bay SAS/SATA JBOD Enclosure
- HighPoint RocketRAID 2744 Controller

Kit Contents

Item	Count
NetStor Enclosure	1
HighPoint RocketRAID 2744	1
HDD Trays	16
mini-SAS (SFF-8088) Cable	4
Power Cord	1
Manual CD-ROM	1
HDD mounting screws	64
HDD lock keys	2

RocketStor 6424TS Feature Specifications	
Host Port	4x Mini-SAS
RAID Controller /Bus Interface	RocketRAID 2744 / PCIe 2.0 x16
RAID Level	0, 1, 5, 10, 50, JBOD
Max. Capacity	Up to 128 TB
Number Of drives	Up to 16
Drive Interface	SAS, SATA
Drive Form Factor	3.5"

Chassis Material	Heavy-duty cold-rolled steel housing
Dimension	18" (d) x 19" (W) x 5.16" (h)
Weight	47.50 lbs.
UPC	643653642410
Warranty	2 Years
Advanced RAID Features	Flash ROM for Upgradeable Firmware
	Storage Health Inspector
	Redundant RAID Configurations
	BIOS PnP (plug and play) and BBS (BIOS boot specification) support (Note: does not apply to Mac OS X)
	Bootable RAID Array
	Multiple RAID Partitions supported
	Multiple RAID Adapters supported
	Online Array Roaming
	Online RAID Level Migration (ORLM)
	Online Capacity Expansion (OCE)
	RAID Initialization Background/Foreground/Quick
	Global Hot Spare Disk support
	Automatic and configurable RAID Rebuilding Priority
	Disk Format compatible: 512, 512e, 4Kn
	Larger than 2 TB Drive and RAID Array support
	Spin down Massive Arrays of Idle Disks support
	Native Command Queuing
	Stagger Drive Spin Up
	Write Back and Write Through
Storage Monitoring and Management Suite	
RAID Management Suites:	RAID Management Suites, BIOS/Firmware configuration tool, Browser-Based management tool, CLI(Command Line Interface) - scriptable configuration tool, API package
SMTP	Email Alert notification
Cooling Fan:	Four 60×60×25 mm
Power Supply	Redundant 400 W 100-240 V AC, 50/60 Hz universal
LED Display for Each Tray	White - Power-On Indicator / Blue -Busy (HDD Access) Indicator
LED Display For Enclosure	POWER on LED (white) / FAN (Normal – green; Fail – red) / TEMP (Normal – green; over 55°C – red)
Operating System Support	
Window	Windows / Windows Server
Linux:	RedHat Enterprise, Open SuSE, Fedora Core, Debian, Ubuntu
FreeBSD	9.3 and Later
Mac OS X	OS X 10.6 and later
Driver embedded	OS X 10.10 (apply for RocketStor 6422TS)
Operating Environment	
Temperature	(Operating) 5°C – 45°C / (Non-operating) -40°C – 65°C

Relative Humidity	(operating) 8% – 90% RH (Non-condensing) / (Non-operating) 5% – 95% RH (Non-condensing)
Certification	CE, FCC, RoHS

Section 1: Hardware Installation

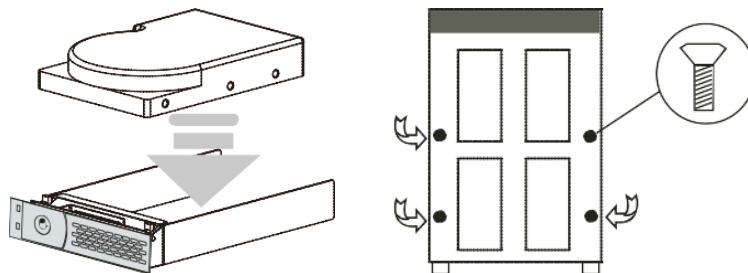
This section covers the following topics:

1. Setting up the Enclosure
2. Setting up the HBA (Host Bus Adapter)
3. LED Activity

Preparing the Enclosure

You can refer to the NetStor 3U 16-Bay Rackmount Quick Installation Guide for details on how to set up the enclosure.

1. Take out the HDD tray and place your hard drive in the tray as shown below. Then install the tray back into the enclosure. Repeat for all your hard drives.



2. Optional) Lock your HDD tray with the included disk tray key.
3. Place the enclosure on a server rack or another stable, flat surface.
4. Connect the enclosure to a power source with the AC Power Cord.
5. Connect the enclosure to the included RocketRAID 2744 using the mini-SAS to mini-SAS cable (SFF-8088).

Preparing the HBA (Host Bus Adapter)

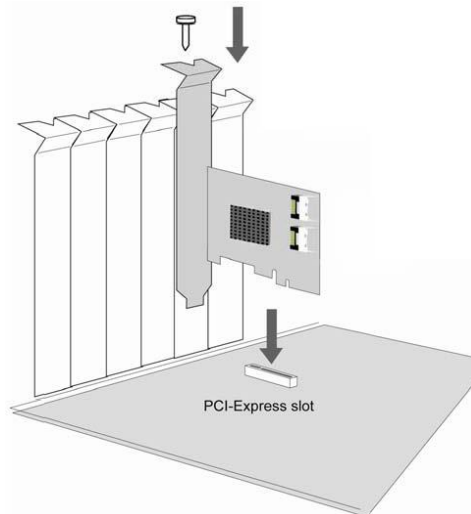
The following instructions describe how to prepare your RocketRAID 2744 HBA for use.

To install your RocketRAID 2744:

Important: Before installing the RocketRAID 2744 Controller, ensure that your system is powered **OFF**.

1. Locate a PCIe 2.0 x8 slot (or compatible slot) on your PC motherboard.
 - **Note 1:** Refer to your PC manual for instructions on how to access your motherboard.
 - **Note 2:** Refer to your motherboard manual for instructions on how to locate your PCI Express slot.
2. Align the RocketRAID 2744 with the PCIe slot and push straight down until card is fully seated.
3. Tighten the connection by fastening the RocketRAID bracket and enclosure together.

A PCI-Express 2.0 x8 card is compatible with PCI-Express 2.0 x16 and PCI-Express 3.0 x16 slots, as well as PCIe 2.0 x8, PCIe 3.0 x8 slots.



Connecting the HBA with the Enclosure

Use the mini-SAS (SFF-8088) cables provided to connect the enclosure ports (located on the back panel) to the RocketRAID 2744 port.



Figure 1. Enclosure Front Panel

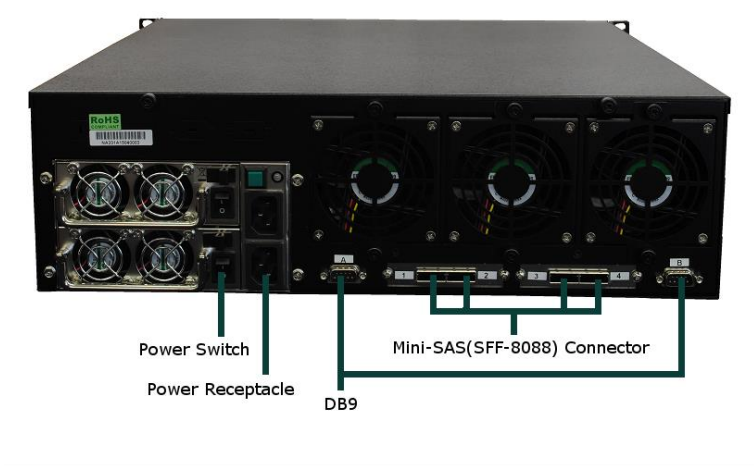


Figure 2. Enclosure Back Panel

Key			
1	HDD Power LED	5	Temperature LED GREEN - Normal RED - Over 55°C
2	HDD Status LED	6	Power Cord Receptacle
3	MUTE Button	7	Mini-SAS (SFF-8088) Connector
4	Fan Status LED GREEN - Normal RED - Failed	8	DB9 Connector SGPIO Signal for HDD fail display

LED Activity

The following information tells you how to interpret LED activity seen on the enclosure and disk trays.

	Present	Active	Failed	Identify
Disk Tray	WHITE	BLUE	N/A	N/A
Enclosure LEDs	WHITE		N/A	N/A
Fans LEDs		GREEN	RED	N/A
Temperature LEDs		GREEN	RED	N/A

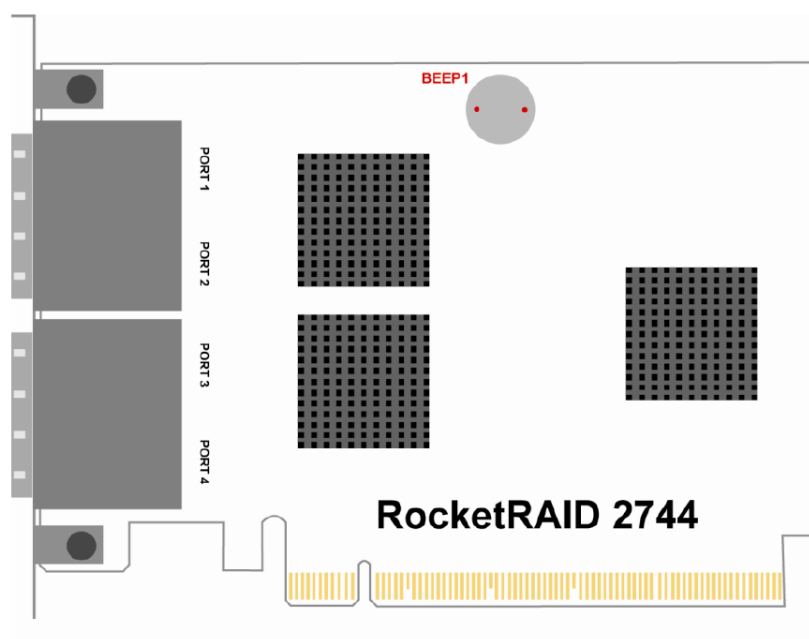
Present - Indicates that the disk is present and available.

Active - Indicates the disk is performing disk I/O

Failed - Indicates disk failure (**Not available for RS6424TS enclosure**)

Identify - Identify LED is a setting that can be enabled in Physical > devices. This setting will bring up a RED LED for the drive that is enabled for easy identification.

Identify LEDs are not available on the RS6424TS enclosure.



Key	
PORT 1	Mini-SAS (SFF-8088) connection. Corresponds to channel 1 - 4

PORT 2	Channel 5 - 8
PORT 3	Channel 9 - 12
PORT 4	Channel 13 - 16
BEEP1	Alarm/Buzzer

Section 2: Drivers

This section covers the following topics:

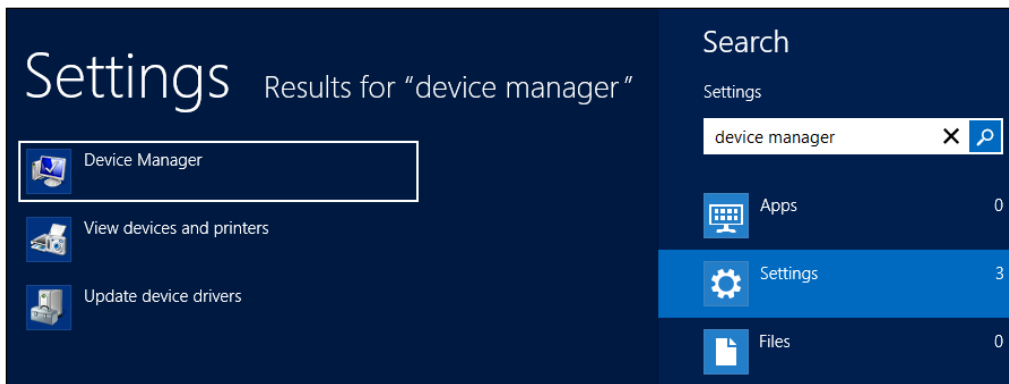
- Installing drivers on your Operating System
- Verifying driver installation
- Loading drivers on a bootable array
- Updating drivers
- Uninstalling drivers

Installing Drivers on an Existing Operating System

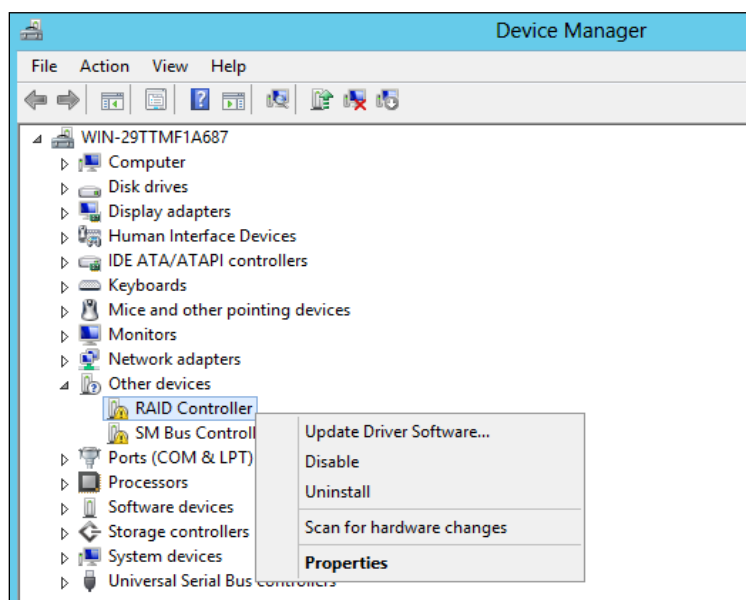
Drivers provide a way for your operating system to communicate with your new hardware. Updating to the latest drivers ensures your product has the latest performance, stability, and compatibility improvements. Drivers are updated regularly at www.highpoint-tech.com

For **Windows** Users:

1. Obtain latest driver software for RocketRAID 2744 Controller from our website www.highpoint-tech.com
2. Take note the location you downloaded the driver file to, then open Windows **Device Manager**.
 - Click **Start**
 - Click **Control Panel**
 - Click **Hardware and Sound**
 - Under **Devices and Printer**, Click **Device Manager**
 - **Note:** Alternatively, you can search **Device Manager** in your start menu search bar.

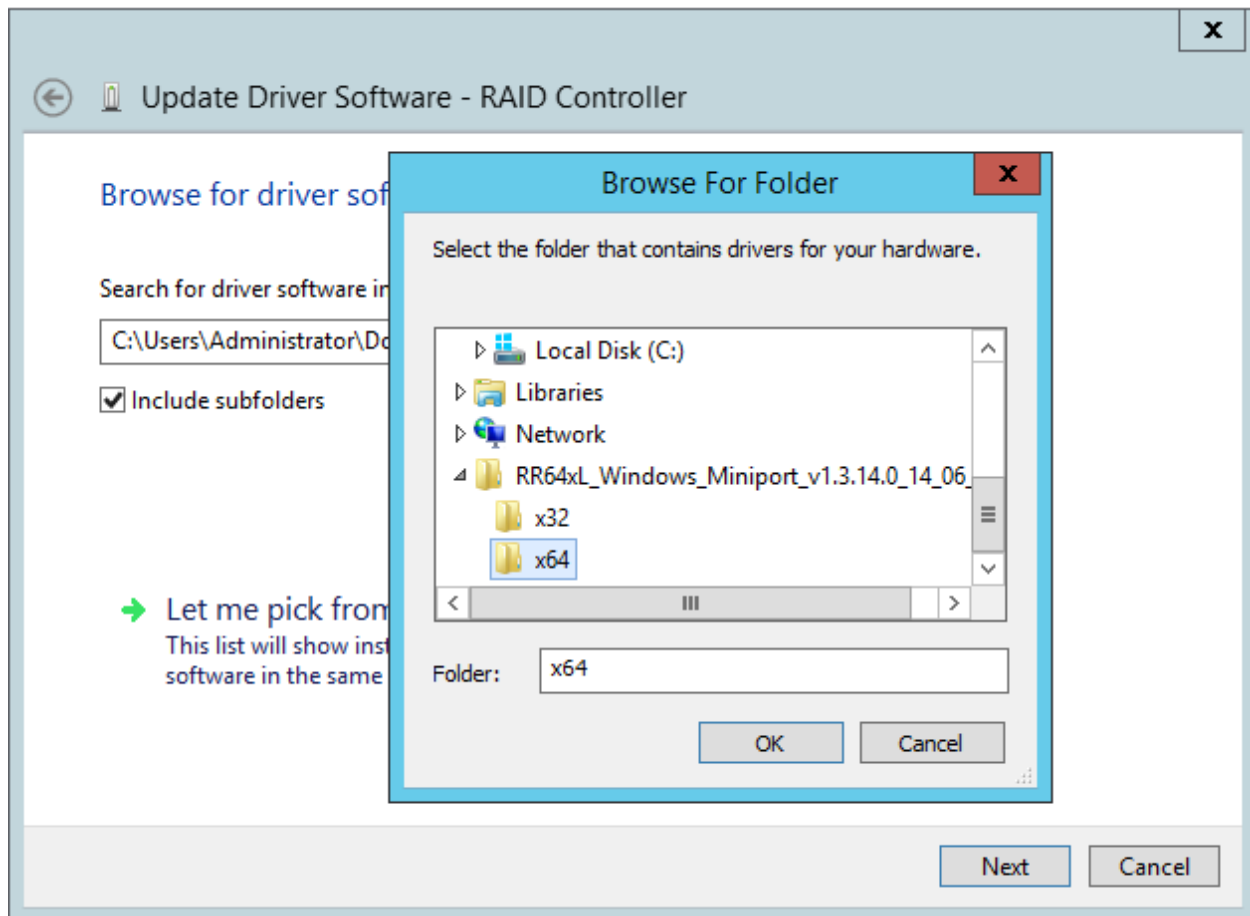


3. Under **Other Devices**, right click on **RAID controller**



4. On the drop down menu, click **Update Driver Software...**

5. When prompted, select **Browse my computer for driver software**

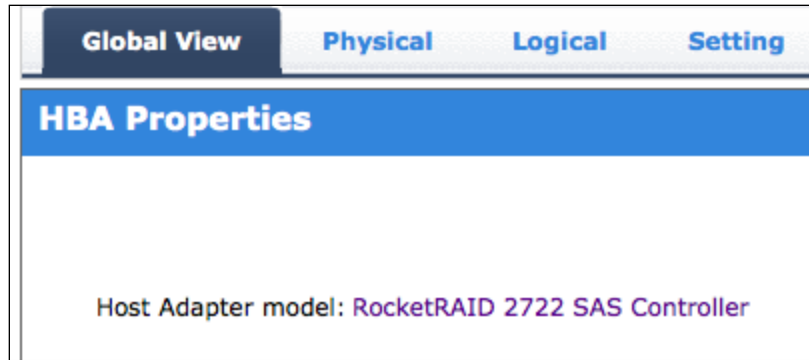


6. Locate the driver files you downloaded and select them.
7. Press **next** and follow the on screen instructions
8. **Reboot**

For **Mac** Users:

HighPoint Mac Drivers have file extension **.dmg**; make sure the file extension for the files you downloaded are the same.

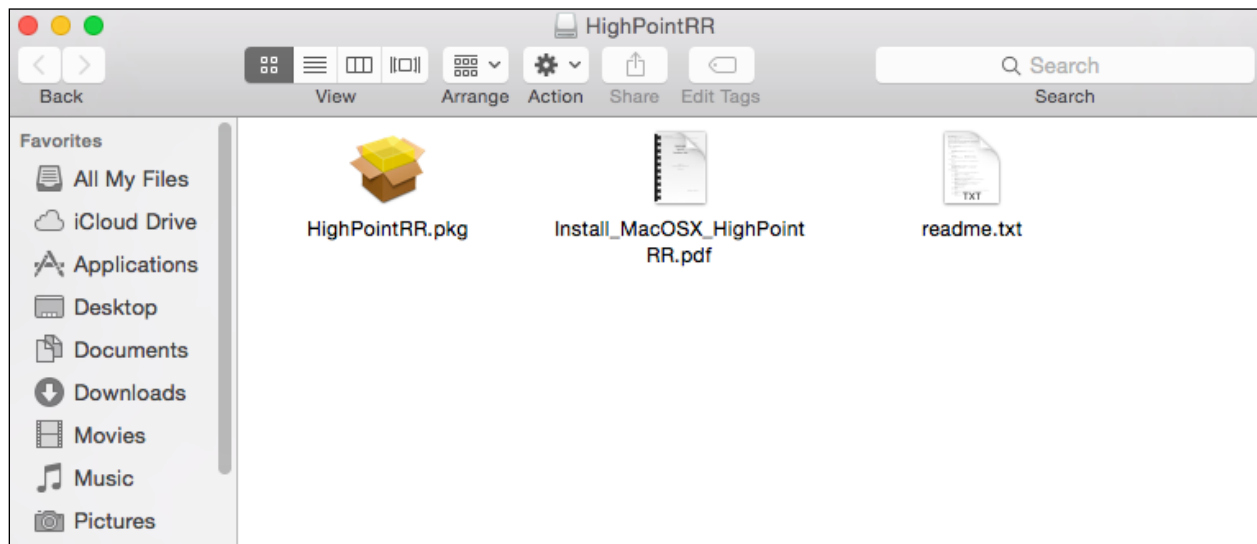
1. Obtain latest driver online at www.hptmac.com
 - Navigate to your specific HBA controller page (Refer to **How to View HBA Properties** to find model name)



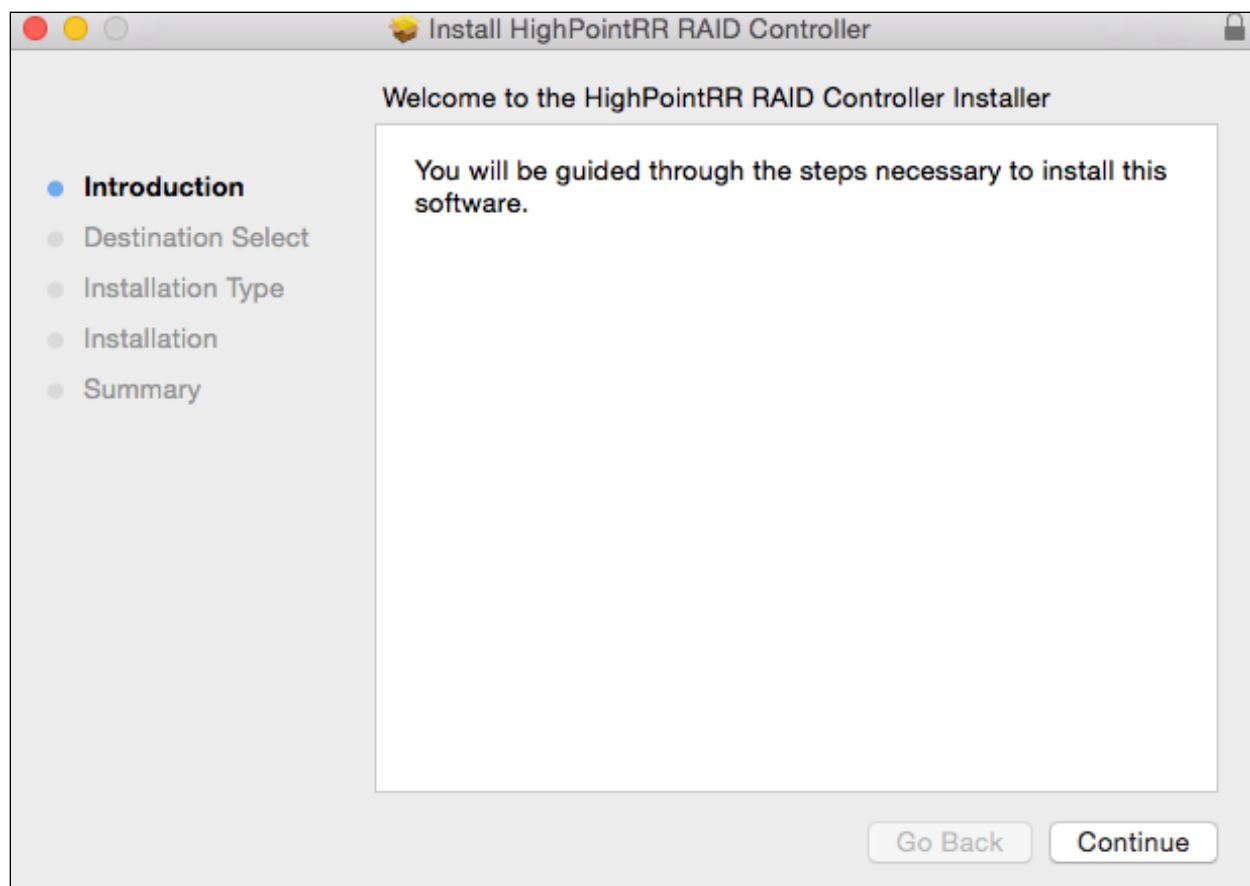
2. Once downloaded, locate the folder you downloaded the driver to and double click on the file named "HighPointRR_###.dmg" **Note:** File name varies, but extension is **.dmg**.



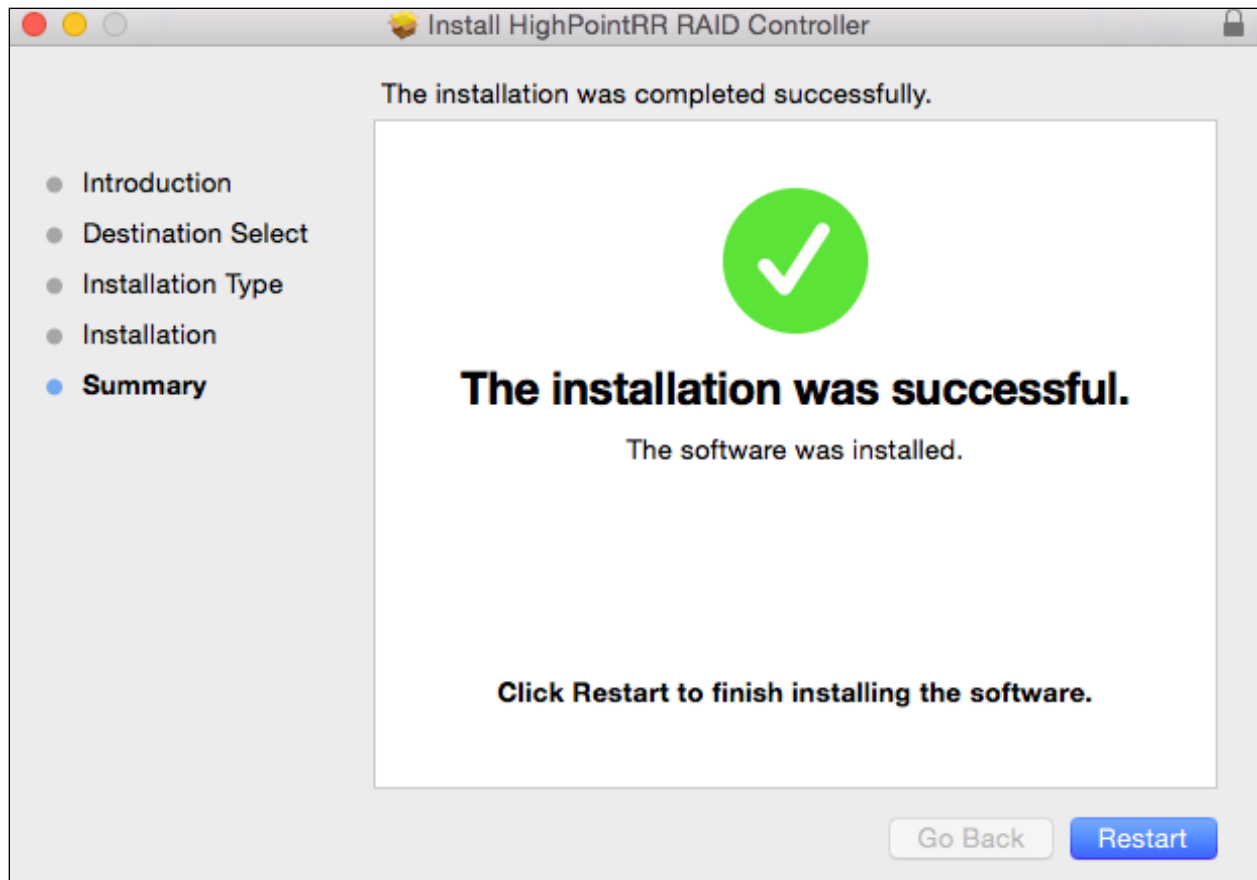
3. The file will be mounted onto the operating system, click on **HighPointRR.pkg** located on the mounted drive.



4. Follow the on-screen instructions.



5. **Reboot** computer



6. Make sure **Driver Installed** is Yes

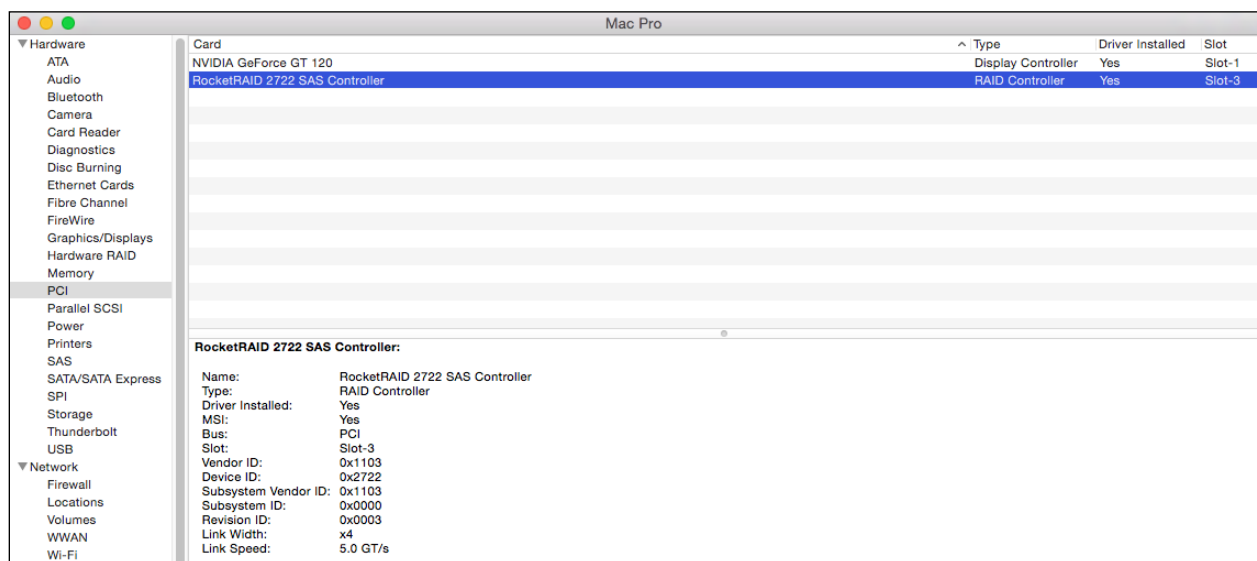


Figure 3. Click Apple Icon > About this Mac... > System Report > PCI

For **Linux** Users:

Refer to the installation guide or README in driver files for the latest and accurate installation steps.

1. Download the latest Linux open source driver from www.highpoint-tech.com.
2. Unzip the .gz file using `gunzip <filename>`
3. Unzip the .tar file using `tar -xvf <filename>`
4. Refer to the **README** for the command line to install
5. For RocketRAID 272X HBA type `chmod +x <filename>`

Checking your Driver Installation

To check if the driver was installed successfully follow the instructions below. The same procedure can be used to determine your driver version.

For **Windows** Users:

1. Click **Start**
2. Click **Control Panel**
3. Click **Hardware and Sound**
4. Under **Devices and Printer**, Click **Device Manager**
Note: Alternatively, you can search Device Manager in your start menu search bar.
5. Click the **Storage controllers** tab
 - If driver is installed it will show **RocketRAID 2744 Controller**,
 - If driver is *not* installed it will be located in **Other devices** as **RAID Controller**
 - Click **Properties**, then click the **Driver** Tab to find out the version installed.

For **Mac** Users:

1. Click on the Apple Icon (🍏)
2. Click **About this Mac**
3. Click **More Info**
4. Click **System Report**



5. Select PCI Cards

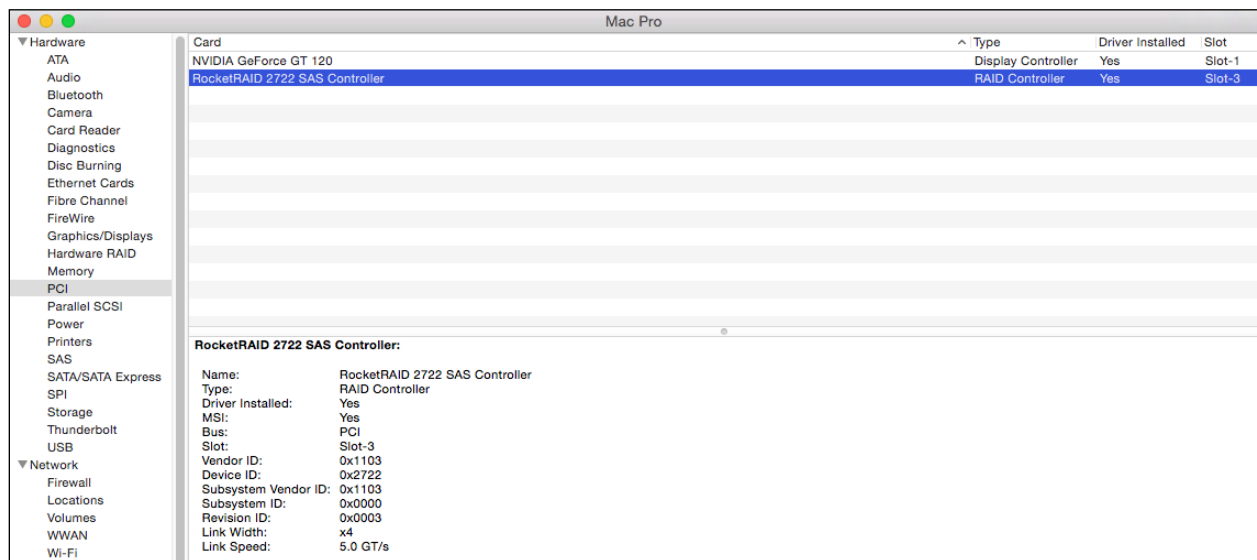


Figure 4. Navigate to Apple Icon > About this Mac > System Report > PCI

Loading Drivers onto a Bootable Array

Creating an array and then installing Windows OS onto the RAID configuration is a bootable array. Since you cannot use the conventional method of installing drivers, the drive must be loaded during Windows installation.

For **Windows** Users:

1. On first boot-up, press **CTRL + H** during the HighPoint RocketRAID splash screen to enter the BIOS RAID creation utility.
2. Create the array you want to install your Windows Operating System onto

3. With the array created, download the RS6424TS drivers from www.highpoint-tech.com and load them onto a **USB**. You will need to locate the files when prompted to load drivers during Windows Installation
4. Start Windows Installation.
5. When prompted **Where do you want to install Windows?** Click **Load Driver**
6. When prompted, click **Browse**
7. Browse to your connected USB and driver files you downloaded
8. Click **OK**, and once loaded, you will see a list of drivers detected.
9. Select
10. Click **Next**, and you should see the RAID arrays you created
11. Select the RAID array and click next
12. Follow the Windows installation instructions to complete your installation

A bootable array differs for Mac users since there is no way to load the HBA drivers during installation. The only way to create a bootable array would be to use 3rd party software, and clone the bootable drive.

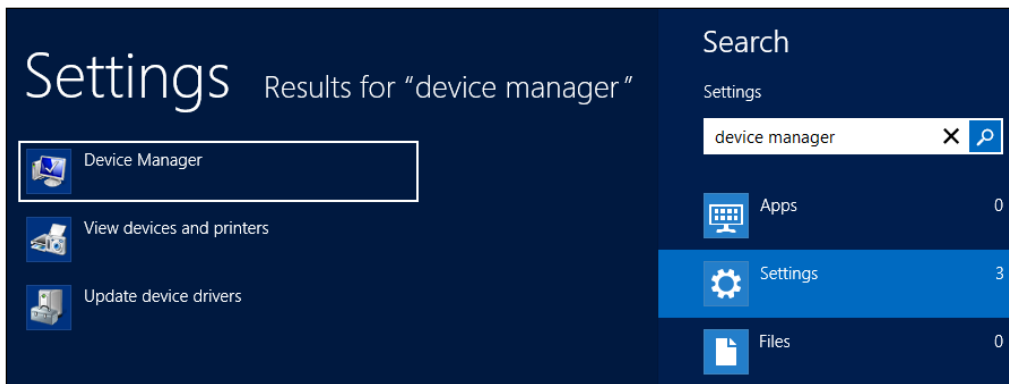
For **Mac** Users:

1. You must have an existing installation of the Mac operating system installed.
2. Set up the RS6424TS normally by
 - Setting up the hardware ()
 - Installing HighPoint WebGUI
 - Creating an Array using the WebGUI
3. Once an array is created, the logical volume can be seen by your operating system
4. Use a 3rd party disk cloning tool to copy your bootable drive onto the logical drive you just created.

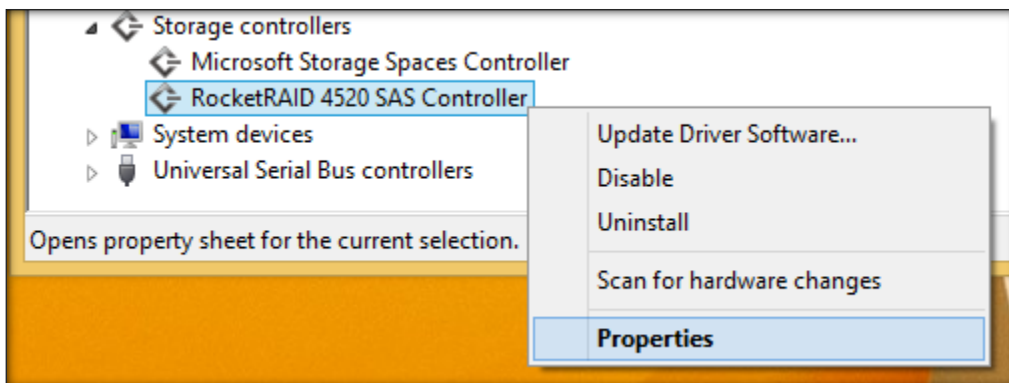
Updating the Drivers

For **Windows** Users:

1. Obtain the latest driver files for **RocketRAID 2744** from www.highpoint-tech.com
2. Open Windows **Device Manager**
 - Click **Start**
 - Click **Control Panel**
 - Click **Hardware and Sound**
 - Under **Devices and Printer**, Click **Device Manager**
 - **Note:** Alternatively, you can search Device Manager in your start menu search bar.



3. Click the **Storage controllers** tab
4. Right click **RocketRAID 2744 Controller**



5. Click **Update Driver Software...**
6. Click **Browse my computer for driver software**
7. Select the driver files you downloaded
8. Click **next**
9. **Reboot**

Uninstalling the Drivers

Refer to the **Installation Guide** or **README** included in the driver files for the most up to date and accurate way of removing drivers.

For **Windows** Users:

1. Open Windows **Device Manager**
 - Click **Start**
 - Click **Control Panel**
 - Click **Hardware and Sound**
 - Under **Devices and Printer**, Click **Device Manager**

- **Note:** Alternatively, you can search Device Manager in your start menu search bar.
2. Click the **Storage controllers** tab
 3. Right click **RocketRAID 2744 Controller**
 4. Click **Uninstall**
 5. Check the **Delete the driver software for this device** checkbox when prompted
 6. Click **OK**
 7. **Reboot**

For **Mac** users:

To uninstall the driver, remove the files copied to your system.

OSX 10.6, 10.7, 10.8	/System/Library/Extensions/rr274x.kext
OSX 10.9, 10.10	/Library/Extensions/rr274x.kext

1. Remove/Delete the rr274x.kext to uninstall the driver.
2. **Reboot** your system for changes to take effect.

Section 3: Navigating RocketRAID 2744 BIOS Utility (PC only)

The RocketRAID BIOS is capable of viewing and creating RAID arrays. You can enter the BIOS by pressing **CTRL+H** during boot up.

To enter the RocketRAID BIOS:

1. Boot up your PC
2. When RocketRAID splash screen appears, press **CTRL + H**
3. You will enter the RocketRAID BIOS Setting Utility

Use the following keys to navigate the BIOS utility	
Keyboard Arrow Keys	Navigate the menu
Enter	Makes a selection
ESC	Exit current menu / exit BIOS utility

Table 1. Summary of BIOS options

	Function	Options
Create	Configure RAID arrays	• RAID 0 : Striping • RAID 1: Mirroring • RAID 1/0: Striping over Mirroring • RAID 5: Striping with Rotating Parity • RAID 5/0: Striping over RAID 5 • JBOD (Volume) Refer to RAID level reference chart for more information on individual RAID levels.
Delete	Delete RAID arrays	• Your created RAID arrays
Add/Remove Spare	Add or remove spare drives	• Your Physical Drives.
Settings	Adjust boot settings	• Select Boot Device • Staggered spin up
View	View your physical drives or RAID arrays	• Devices • RAID array
Initialize	Initializes your drives	• Your Physical Drives

Create

Select this option to begin creating your RAID arrays.

1. Navigate to **Create** using your keyboard arrow keys
2. Press **Enter** to open the drop down
3. Select desired RAID level and press enter

Table 2. Options under Create

Array Name	Press enter and input a desired array name
Select Devices	A list of detected physical drives will appear Press enter for each drive you want in the array Press ESC when finished
Capacity	Input the amount of disk space you want array to take (GB)
Cache Policy	Select Write Through or Write Back
Sector Size	Select desired logical sector size, [512B, 1K, 2K, 4K] Current operating systems render this option redundant and not necessary.
Create	Creates the array using the settings provided

Delete

When RAID arrays are created, the HighPoint controller will store “RAID markers” on the first few sectors of your hard drives. Deleting the RAID array will delete the RAID markers, rendering the data inaccessible.

1. Navigate to **Delete** using arrow keys
2. Press **Enter**
3. Select desired RAID array
4. Press **Enter** to delete
5. Confirm deletion by pressing **Y** or cancel deletion by pressing **N**.

Add/Remove Spare

Physical disks that are added as spares are known as spare drives. Spare drives will automatically replace a failed drive and initiate the rebuilding process.

To configure a spare drive in BIOS:

1. Navigate to add/remove spare using arrow keys
2. Navigate to the drive you want added as a spare
3. Press **Enter** **Note:** Drives configured in a RAID array already cannot also be a spare drive
4. Pressing **Enter** on a drive with the status **configured (spare)**, which means it was previously set as a spare, will remove the drive from the spare pool.

Settings

Select Boot Device

If you are booting from your RAID array, you can set a boot marker onto the array using this option. The motherboard BIOS will set the RocketRAID card as a boot priority when this option is checked.

1. Navigate to settings using arrow keys
2. press **Enter**
3. press **Enter** again
4. Select the desired RAID array
5. You will return to the main screen once flag is set.

Staggered Spin Up (Default: Disabled)

Staggered Spin up is implemented for users that need to power up multiple Harddrives. Powering on all hard drives simultaneously draws a large electrical load; staggered spin up will power on each hard drive one at a time resulting in a stable, lower current draw.

Enabling this setting will instruct the card to power up the hard disks sequentially (one disk approximately every 2 seconds). Some disks do not support this feature, and it is not recommended to enable this option if that is the case.

View

The following two options, devices and RAID array, offers certain information related to either the physical drive or logical drive.

Devices

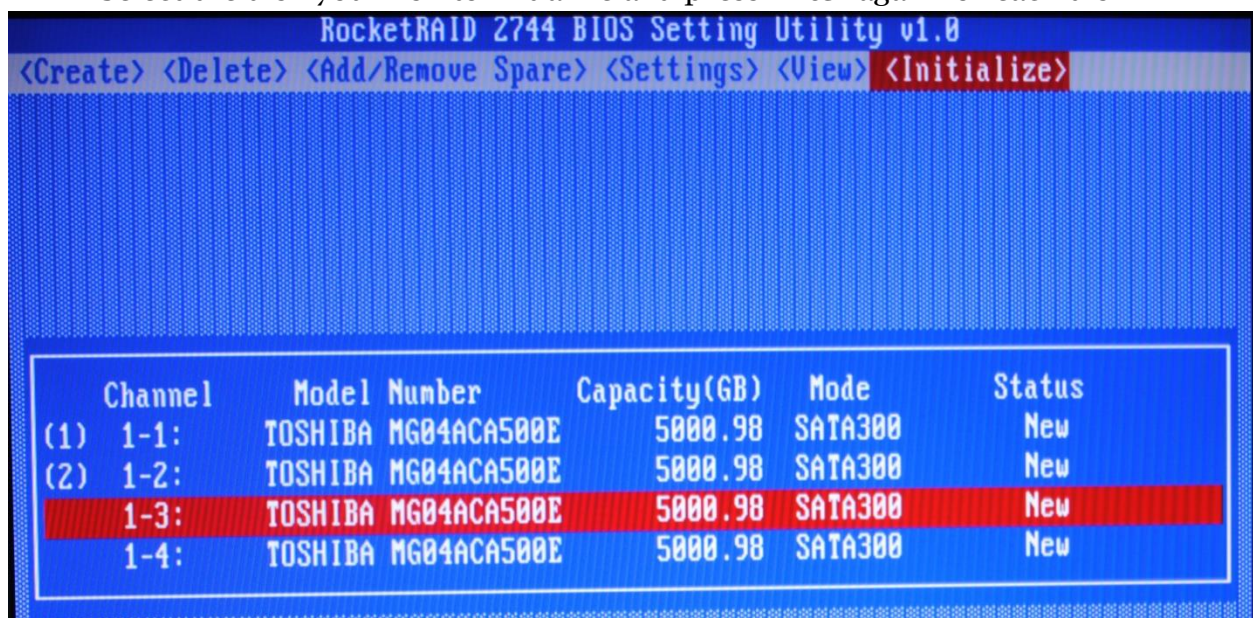
- **Channel:** location of physical drive
- **Model Number:** name of physical drive
- **Capacity:** total capacity of physical drive
- **Mode:** Physical drive controller mode
- **Status:**

RAID Array

- **Array name:** Name of your array
 - **RAID Level:** Level of your array
 - **Capacity:** Total capacity of array
 - **Status:** Normal, critical, or disabled
 - **OCE/ORLM:** Expansion/migration status
-

Initialize

1. To initialize your disks:
2. Navigate to initialize using your arrow keys
3. Press **Enter**
4. Select the disk you wish to initialize and press **Enter** again for each disk



	Channel	Model Number	Capacity(GB)	Mode	Status
(1)	1-1:	TOSHIBA MG04ACA500E	5000.98	SATA300	New
(2)	1-2:	TOSHIBA MG04ACA500E	5000.98	SATA300	New
	1-3:	TOSHIBA MG04ACA500E	5000.98	SATA300	New
	1-4:	TOSHIBA MG04ACA500E	5000.98	SATA300	New

Figure 5. The first two disks, (1), (2) are set to be initialized.

5. Press **Esc** to prompt initialize
6. Press **Y** to allow initialize or **N** to cancel.
7. Disk status will change to **Initialized**.

Section 4: BIOS/Firmware Updates

How to Update RocketRAID BIOS/Firmware

There are two ways to update your RocketRAID BIOS/Firmware

1. Using HighPoint WebGUI Update Firmware
2. Using a bootable USB

A few reasons as to why update BIOS/Firmware

BIOS resource issue	Inefficient BIOS code may cause your boot-up to hang during POST.
Compatibility fixes	Updating firmware may fix issues that occur when using later hardware
Bug fixes	Bugs that are discovered post release are fixed in subsequent updates.

Note: It is recommended to update the BIOS through HighPoint WebGUI. (See Installing HighPoint WebGUI)

Having the latest BIOS ensures you have the latest firmware stability and performance improvements. Updating the BIOS may fix boot up or system resource issues; be sure to read the README before making any changes.

Using the WebGUI to update BIOS/Firmware

1. Locate the latest firmware on our webpage at www.highpoint-tech.com
2. Example firmware file will be in a zipped package with a naming convention such as RR2744-BIOS-vXXXX.zip (name of file subject to change)
3. Extract the contents of the file

4. Read the readme (if included) to make sure you have the correct firmware for your HBA **Note:** Your HBA name and properties can be found in the **WebGUI > Physical Tab**.
5. Locate the proper BIOS file (eg. rr2744.v11, see the README to confirm)
6. Log in to WebGUI (Default user: RAID pass: hpt)
7. Select your controller in the drop down menu on the top left.
8. Click the Physical tab and update firmware will be on the bottom of the page.
9. Click **Choose File** and browse to the BIOS file (eg. rr2744.v11)
10. Click **Submit**
11. **Reboot**

Using a Bootable USB to update BIOS/Firmware

Create a bootable USB using a utility such as Rufus. **Caution:** Creating a bootable USB will erase all previous data stored on it.

1. Download the latest BIOS/Firmware file found at www.highpoint-tech.com
2. **Extract** the file contents onto the bootable USB
3. Read the **README** for instructions on how to flash the BIOS onto your hardware.
4. Reboot your computer into DOS mode by:
 - Setting boot priority to the bootable USB
 - Removing all bootable drives (OS, CD Drives) from motherboard and leaving only the bootable USB and RocketRAID card plugged in
5. Once in DOS mode, you should see a command line interface

```

Copyright (C) 1997-2013, Intel Corporation

PXE-E61: Media test failure, check cable
PXE-M0F: Exiting Intel Boot Agent.

Intel(R) Boot Agent GE v1.5.04
Copyright (C) 1997-2013, Intel Corporation

PXE-E61: Media test failure, check cable
PXE-M0F: Exiting Intel Boot Agent.

FreeDOS kernel 2041 (build 2041 OEM:0xfd) [compiled Feb  7 2012]
Kernel compatibility 7.10 - WATCOMC - 80386 CPU required - FAT32 support

(C) Copyright 1995-2012 Pasquale J. Villani and The FreeDOS Project.
All Rights Reserved. This is free software and comes with ABSOLUTELY NO
WARRANTY; you can redistribute it and/or modify it under the terms of the
GNU General Public License as published by the Free Software Foundation;
either version 2, or (at your option) any later version.
C: HD1, Pri[ 1], CHS=   0-1-1, start=   0 MB, size= 7788 MB

FreeCom version 0.84-pre2 XMS_Swap [Aug 28 2006 00:29:00]
Using US-English keyboard with US-English codepage [437]
C:\>_

```

Figure 6. Bootable USB formatted with Rufus Utility, FreeDOS CLI (Command Line Interface)

6. Type in the command you found in the README (ex. **load.exe <filename>**, varies between products)
7. For RocketRAID 2744, the command is **load.exe rr2744D.v11** (for BIOS v1.1, as of 5/29/15)

```

Volume in drive C is FREEDOS
Volume Serial Number is C426-AF92

Directory of C:\BORK

.                <DIR>  04-20-15  9:41a
..               <DIR>  04-20-15  9:41a
RR644L~1 ZIP      105,572  05-29-15 10:54a
README  TXT       2,252  03-06-13  4:01a
LOAD    EXE      119,186  01-16-13  7:40p
RR644LS V11      72,903  03-06-13  3:39a
644LSL~1 100      4,096  01-16-13  7:49p
          5 file(s)      304,009 bytes
          2 dir(s)      6,683 Mega bytes free
C:\BORK>load.exe RR644LS.V11

Load Utility for Flash EPROM v12.9.3
(built at Jan 17 2013 10:40:15)

Set flash size to 72K
Found adapter 1 at bus 1, device 0
Flash size 0x12000, File size 0x11cc7
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
Do you want to backup BIOS(Y/N): _

```

Figure 7. Navigate to folder you extracted files to, then type command found in README. In this case, load.exe RR644LS.V11

8. Reboot

Section 5: Navigating the HighPoint WebGUI

The HighPoint WebGUI management utility allows you to do several key things:

- Create and remove arrays
- Monitor disk health
- Update firmware and BIOS
- Change enclosure settings
- Troubleshoot faulty drives
- View general system overview

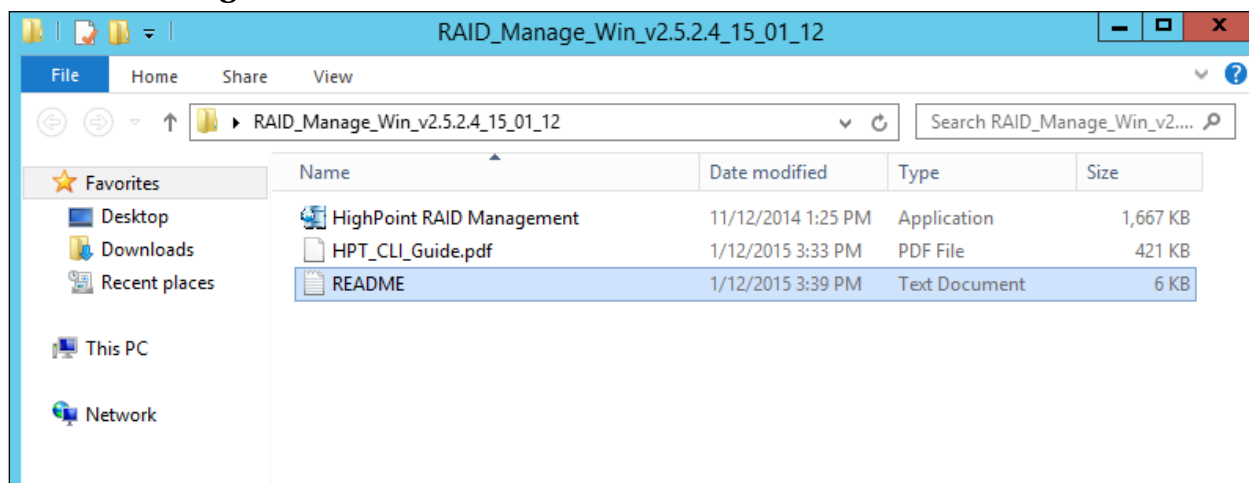
Tab Name	Function
Global View	View HBA (Host Bus Adapter) and Storage Properties
Physical	View Additional Controller properties Update BIOS/Firmware View disk properties Adjust selected disk behaviors
Logical	Manage and create RAID arrays
Setting	Adjust WebGUI controls settings
Event	Show WebGUI Event Log
SHI (Storage Health Inspector)	View and schedule S.M.A.R.T monitoring
Recover	Revert to previously created arrays
Logout	Logout of WebGUI
Help	Additional WebGUI documentation Online Web Support

Installing HighPoint WebGUI

The HighPoint WebGUI is the primary link between you and your RAID array. Using the management utilities and menus offered by the WebGUI, you will be able to access, create, and maintain your RAID arrays.

New features are continually added to the interface; update to the latest version at www.highpoint-tech.com.

1. Locate the HighPoint WebGUI Setup on our website www.highpoint-tech.com and download the WebGUI package. Extract the contents and double click on **HighPoint RAID Management.exe**



Follow the on screen steps to install our software.



2. Log in the WebGUI by double clicking the desktop icon created or by typing <http://localhost:7402> in your preferred browsers address line (it is recommended to use the latest version of your browser.)



How to Login HighPoint WebGUI

You can reach the HighPoint WebGUI log in page either by:

- Double clicking on the **HighPoint RAID Management** icon created on your desktop
- Opening your preferred web browser and typing <http://localhost:7402> in the address bar.

The default username and password to login is

Username: RAID

Password: hpt

Username and Password are Case-Sensitive (Username is not changeable)

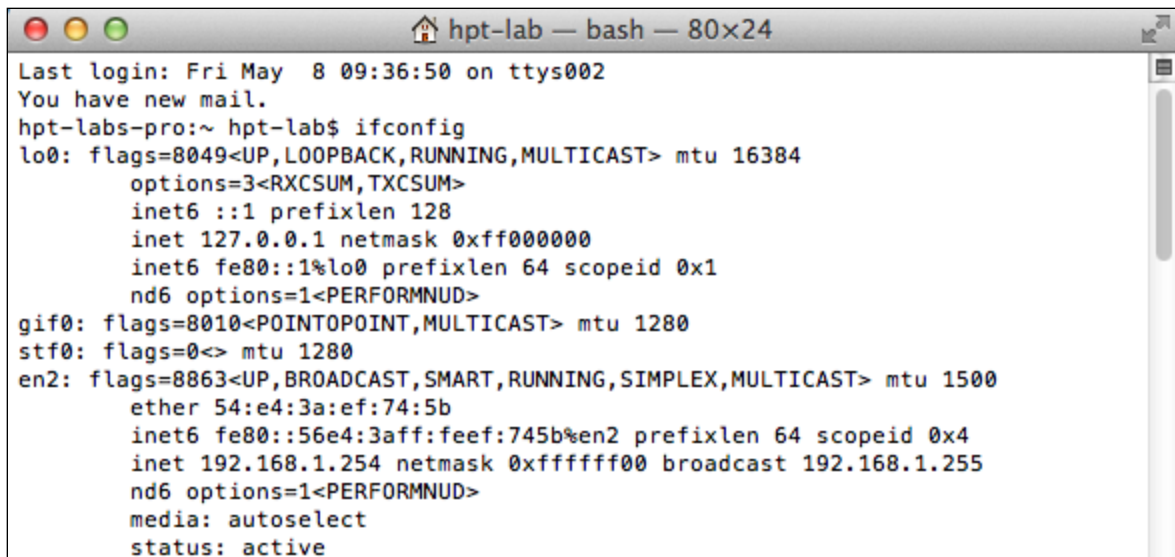
Remote Login

A user connected to a local network can remotely access the WebGUI using the IP address of the host device.

To obtain your IP address

For **Mac** Users:

1. Open a **terminal** window on the host computer (computer that is connected to the RS6424TS enclosure)
2. Type `ifconfig`
3. Look for the connection that has **status: active**
4. Write the IP address located after **inet:**

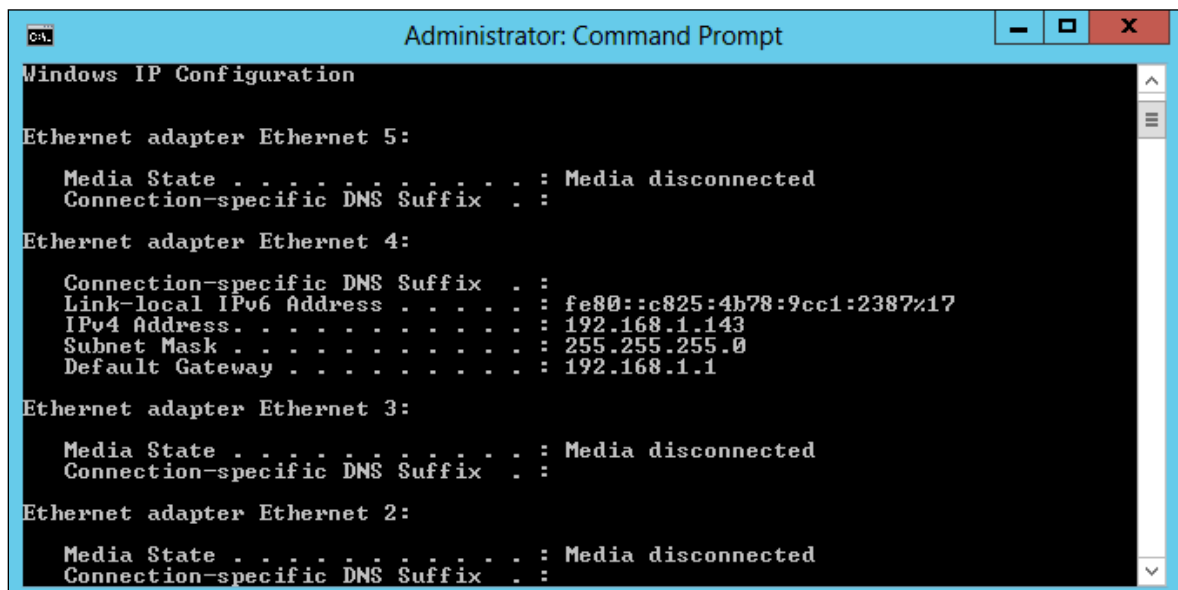


```
hpt-lab — bash — 80x24
Last login: Fri May  8 09:36:50 on ttys002
You have new mail.
hpt-labs-pro:~ hpt-lab$ ifconfig
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384
    options=3<RXCSUM,TXCSUM>
    inet6 ::1 prefixlen 128
    inet 127.0.0.1 netmask 0xff000000
    inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1
    nd6 options=1<PERFORMNUD>
gif0: flags=8010<POINTOPOINT,MULTICAST> mtu 1280
stf0: flags=0<> mtu 1280
en2: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
    ether 54:e4:3a:ef:74:5b
    inet6 fe80::56e4:3aff:feef:745b%en2 prefixlen 64 scopeid 0x4
    inet 192.168.1.254 netmask 0xfffff00 broadcast 192.168.1.255
    nd6 options=1<PERFORMNUD>
    media: autoselect
    status: active
```

Figure 8. Example: en2 has active status, the IP is 192.168.1.254

For **Windows** Users:

1. Open a command prompt window on the host computer.
2. Type ipconfig
3. Look for the section that contains your network adapter information
4. Take **Note** the IP address



```
Administrator: Command Prompt
Windows IP Configuration

Ethernet adapter Ethernet 5:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet 4:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::c825:4b78:9cc1:2387%17
    IPv4 Address. . . . . : 192.168.1.143
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Ethernet 3:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter Ethernet 2:

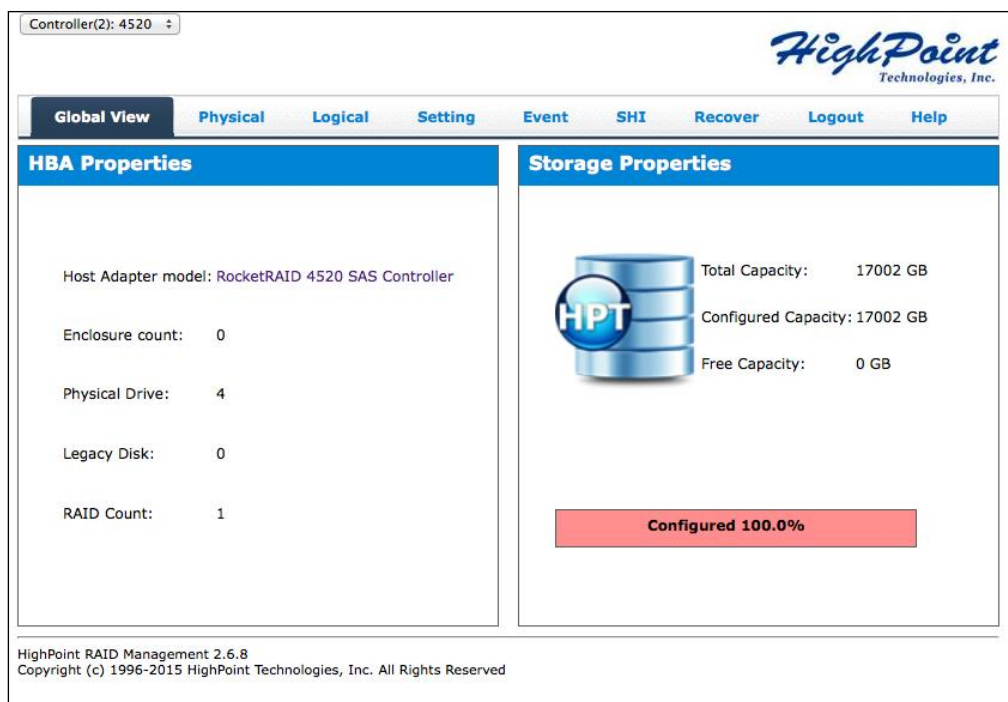
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
```

Figure 9. Example: The IPv4 address is under Ethernet adapter Ethernet 4 and is 192.168.1.143

Note: Make sure **Restrict to localhost access** is **disabled** in **WebGUI Setting** (Refer to setting)

You can then remotely access the WebGUI using any other computer that is in your local network by opening any web browser and typing **http://{IP address of host computer}:7402** (default port is 7402)

Global Tab



The GUI Global view provides an overview of what each HighPoint controller card connected to your computer detects. It is also the first page you see when logging in.

- Host Bus Adapter Properties
- Storage Properties

On the top left of the page is a drop down menu that allows you to select which controller you want to manage (if you have multiple HighPoint controllers connected).

Viewing HBA Properties

1. Log in to WebGUI
2. Select the proper controller from drop down on the top left
3. Click **Global View**

HBA Properties

- **Host Adapter model:** the model name of the controller
- **Enclosure Count:** number of external enclosures detected
- **Physical drives:** number of drives seen by the controller
- **Legacy Disks:** number of Legacy disks connected. Legacy disks are physical drives that have previous partitions stored on them.

Viewing Storage Properties

1. Log in to WebGUI
2. Select the controller from drop down menu on top left
3. Click **Global View**

Storage Properties

Total capacity: the combined capacity of each physical disk connected to controller

Configured capacity: the amount of space used for creating arrays

Free Capacity: total amount of space unused

Physical Tab

The screenshot shows the HighPoint RAID Management WebGUI interface. At the top, there's a dropdown menu showing 'Controller(2): 4520'. The HighPoint Technologies, Inc. logo is in the top right. Below the logo is a navigation bar with tabs: Global View, Physical (selected), Logical, Setting, Event, SHI, Recover, Logout, and Help. On the left side, there's a sidebar with links: Controller, Devices, and Rescan. The main content area is divided into three sections: Controller Information, Extended Information, and Update Firmware.

Controller Information	
Model Name:	RocketRAID 4520 SAS Controller
EFI Version:	v1.1
Vendor:	HighPoint Technologies, Inc.

Extended Information	
IOP Model:	88RC9580 (9580B2)
CPU Temperature:	48°C
Board Temperature:	38°C
Power 3.3V Voltage:	3.26V
Power 2.5V Voltage:	2.50V
Power 1.8V Voltage:	1.81V
Power 1.5V Voltage:	1.53V
Power 1.0V Voltage:	1.02V
SDRAM Size:	512 M
Battery Installed:	Not Installed
Firmware Version:	v1.7.0.0
SAS Address:	500193c011030000

Update Firmware	
Select the blf file to update Firmware. This process may take some time.	
Choose File	no file selected
Submit	

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The physical tab shows general and extended information about the controller you are using. Information about the firmware, BIOS, and operating temperatures are all located here. This information is useful for identifying what RAID controller model you have and to make sure you have the most updated version available.

The physical tab contains the following information:

- Controller Information
- Extended Information
- Update Firmware
- Physical Devices Information

Controller Information: Lists the controller model name, BIOS version, and vendor.

- Model Name: RocketRAID 2744 SATA Controller (for RS6424TS)
- BIOS Version: v1.1 (as of 5/26/2015)
- Vendor: HighPoint Technologies, Inc.

Extended Information: Gives you additional information concerning the HBA (Host Bus Adapter) in the enclosure

- **IOP Model:** IOP chip model number
- **CPU Temperature:** Displays computer temperature in Celcius (°C).
- **Board Temperature:** Displays the board temperature in Celcius (°C).
- **SDRAM Size:** SDRAM size of the HighPoint controller card
- **Battery Installed:** Battery Backup Unit (**Not Applicable**)
- **Firmware Version:** Firmware version of the HBA
- **SAS address:** the SAS address

Update Firmware: Allows you to update the controller BIOS through the WebGUI.

Updating BIOS/Firmware

Keeping the firmware up to date ensures that your RAID controller the latest compatibility and performance updates.

1. Locate the latest firmware on our webpage at www.highpoint-tech.com
2. Extract the contents of the file
3. Read the README to ensure you have the correct firmware for your HBA **Note:** Your HBA name and properties can be found in the **WebGUI > Physical Tab**.
4. Locate the proper firmware file (eg. rr2744D.v11, refer to the readme for exact name)
5. Click **Choose File** and browse to your firmware file

6. Click **Submit**
7. **Reboot**

Select the file to update BIOS.
This process may take some time.

HPT\Desktop\RR2744-BIOS-v1.1-120425\rr2744D.v11

Obtaining Physical Device Information

1. Log in to WebGUI
2. Click **Physical**
3. Click **Devices** located on the left panel

The screenshot displays the HighPoint RAID Management WebGUI interface. At the top, there is a navigation bar with tabs: Global View, Physical (selected), Logical, Setting, Event, SHI, Recover, Logout, and Help. On the left side, there is a sidebar with a 'Controller' dropdown set to '4520', and buttons for 'Devices' (selected), 'Rescan', and 'Unplug'. The main content area is titled 'Physical Devices Information' and lists four physical devices. Each device entry includes a folder icon, a device ID, a model number, a capacity, and various status and configuration options with links to change them.

Device	Model	Capacity
Device_1_1	WDC WD40EFRX-68WT0N0-WD-WCC4ENSLV3U6	4.00 TB
Device_1_2	WDC WD60EFRX-68MYMN1-WD-WX11D74RHHV7A	6.00 TB
Device_1_3	WDC WD30EFRX-68EUN0-WD-WMC4N0DCFMUT	3.00 TB
Device_1_4	WDC WD40EFRX-68WT0N0-WD-WCC4EHYCFZXL	4.00 TB

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The following properties are part of the **Physical Devices Information** box under the physical tab.

- **Model** - Model number of the physical drive
- **Capacity** - Total capacity of the physical drive
- **Revision** - HDD device firmware revision number
- **Read Ahead*** - (Enable/Disable) Disk read ahead.
- **Location** - Device location (example: 1/2 states controller 1, slot 2)
- **Write Cache*** - (Enable/Disable) the disk write cache
- **Max Free** - space on disk that is not configured in an array
- **Status** - (Normal, disabled, critical) status of the disk
- **NCQ*** - (Enable/Disable) Native Command Queuing
- **Serial Number** - serial number of the physical disk
- **Identify LED*** - On/Off - toggle the IDENTIFY (RED) on the front panel
- **Unplug** - Safely ejects selected disk. Other methods of disk removal will trigger alarm if enabled.

* Disk properties that can be adjusted.

Read Ahead

Enabling disk read ahead will speed up read operations by pre-fetching data and loading it into RAM.

Write Cache

Enabling write cache will speed up write operations.

NCQ (Native Command Queuing)

A setting that allows disks to queue up and reorder I/O commands for maximum efficiency.

Identify LED

The Disk tray LED lights on the front panel can be toggled ON or OFF.

Rescan

Clicking rescan will immediately signal the controller to scan for any changes in the connection. Clicking this button will also stop any alarm if currently ringing.

[Logical Tab](#)

Controller(1): 4520


Global View
Physical
Logical
Setting
Event
SHI
Recover
Logout
Help

Create Array
Spare Pool
Logical Device
Rescan
Beeper Mute

Logical Device Information

Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
 Device_1_1	Hard Disk	4.00 TB			HPT DISK 0_3	Legacy
 Device_1_2	Hard Disk	6.00 TB			HPT DISK 0_2	Legacy
 Device_1_3	Hard Disk	3.00 TB			HPT DISK 0_1	Legacy
 Device_1_4	Hard Disk	4.00 TB			HPT DISK 0_0	Legacy

Physical Device Information

Location	Model	Capacity	Max Free
 1/1	WDC WD40EFRX-68WT0N0-WD-WCC4ENSLV3U6	4.00 TB	0.00 GB
 1/2	WDC WD60EFRX-68MYMN1-WD-WX11D74RHV7A	6.00 TB	0.00 GB
 1/3	WDC WD30EFRX-68EUZN0-WD-WMC4N0DCFMUT	3.00 TB	0.00 GB
 1/4	WDC WD40EFRX-68WT0N0-WD-WCC4EHYCFZXL	4.00 TB	0.00 GB

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The Logical tab is where you are edit, delete, and maintain your RAID configurations, as well as, adding drives to your spare pool. The logical tab has the following settings:

- Create Array
- Spare Pool
- Logical Device
- Rescan
- Beeper Mute

Creating an Array

To create an array:

1. Log into the WebGUI
2. Select the proper **controller** from the drop down on the top left
3. Click **Logical**
4. Click **Create Array**

An array is a collection of physical disks that will be seen as one virtual drive by your Operating System (OS). The RS6424VS has a RocketRAID 2744 controller capable of creating the following array types

Controller(1): 4520


Global View
Physical
Logical
Setting
Event
SHI
Recover
Logout
Help

Create Array
Spare Pool
Logical Device
Rescan
Beeper Mute

Create Array

Array Type: JBOD(Volume)

Array Name: Default

Initialization Method: Keep Old Data

Cache Policy: Write Back

Block Size: 64K

Number of RAID5 member disks: -1

Select All

	Location Model	Capacity	Max Free
☐	1/1 WDC WD40EFRX-68WT0N0-WD-WCC4ENSLV3U6	4.00 TB	0.00 GB
☐	1/2 WDC WD60EFRX-68MYMN1-WD-WX11D74RHV7A	6.00 TB	0.00 GB
☐	1/3 WDC WD30EFRX-68EUZN0-WD-WMC4N0DCFMUT	3.00 TB	0.00 GB
☐	1/4 WDC WD40EFRX-68WT0N0-WD-WCC4EHYCFZXL	4.00 TB	0.00 GB

Available Disks:

Capacity: (According to the max free space on the selected disks) Maximum (MB)

DV Mode: Disable
(Enable special cache ploice for DV/sequential write applications)

Margin: 5%
(Adjust the larger marge will achive more stable performance, but it will decrease the maximume write performance.)

Disk Cache Policy: Unchange

Create

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Array Type:

- JBOD – Just a Bunch of Disks
- RAID 0 - Striping
- RAID 1 - Mirroring
- RAID 5 – Rotating Parity bit
- RAID 1/0 – Striping of Mirrored Drives
- RAID 5/0 – Striping of Distributed Parity

Each RAID level has its pros and cons based on the application you use it for (**Note:** Refer to **RAID level Quick Reference**)

Array Name: the name that will be displayed in Logical Device Information (Default: RAID_<level>_<array number>)

Initialization Method: Initialization of a disk sets all data bits to 0, essentially clearing all the data on the drive. It is important to initialize disks since previous data physically stored on the drive may interfere with new data.

- **Keep Old Data:** This option skips the initialization process and all data on each physical disk of the array will be untouched.
- **Quick Init:** This option grants immediate access to the RAID array by skipping the initialization process, but it will delete all data. **Note:** Skipping initialization is generally not recommended since residual data on disks may interfere with new data in the future.
- **Foreground:** The array initialization process will be set at high priority. During this time array will be non-accessible, but initialization completion time will be shorter.
- **Background:** The array initialization process will have a lower priority. During this time array will be accessible, but initialization completion time will be longer.

Note 1: Initializing takes a significant amount of time (approximately 2 hours per 1 TB).

Background and Foreground Initialization

Fully initializing the array will completely zero out the data on the disks, meaning the disk will be completely wiped and every bit on the disk will be set to 0. Foregoing initialization means the array will still be created, and you can still write new data onto the array. But when your array requires rebuilding, residual data left behind may interfere with the process.

Cache Policy (Default: Write Back)

Write Back – Any data written to the array will be stored as cache, resulting in better I/O performance at the risk of data failures due to power outages. Data will be stored as cache before it is physically written to the disk; when a power outage occurs, any data in the cache will be lost.

Write Through – Data written to an array is directly written onto the disk, meaning lower write performance for higher data availability. Without cache acting as a buffer, write performance will be noticeably slower but data loss due to power outages or other failures is significantly minimized.

Block Size (default: 64K)

[16K, 32K, 64K, 128K, 256K, 512K, 1024K are the supported block sizes]

Adjusting the block size towards your disk usage can give some performance gain.

In a typical RAID configuration, data of the virtual drive is striped (or spread across) the physical drives. Having a smaller array block size will increase the likelihood of accessing all physical drives when processing large I/O requests. Multiple physical drives working in parallel increases the throughput, meaning better performance.

For smaller I/O requests (512 bytes to 4 kilobytes), it is better to have each individual disks handle their own I/O request, improving the IOPS (I/O per second), rather than having one tiny I/O request being handled by multiple disks.

A block size of 64k is recommended because it strikes a balance between the two I/O usage scenarios.

Capacity (Default: Maximum)

The total amount of space you want the RAID array to take up. When creating RAID levels, disk capacities are limited by the smallest disk.

An example of how disk capacities are limited by smallest disk.

- You have 3 drives connected to the enclosure.
- First drive is 6 TB, second is 4 TB, and third drive is 2 TB.
- After creating a RAID level 5 using all three drives and maximum capacity
- The first drive will have 4 TB, the second 2 TB, and the third drive 0 TB free capacity
- The free capacity on the first and second drive can be used to create a separate array.

You may also choose how much space each array will take. You can use the remaining space to create another array (up to 4 arrays are supported)

Sector Size (Default: 512B)

Note: For current operating systems, this option is already implemented so changing it in the WebGUI is not necessary.

This option will set the sector size of your virtual drive, and physical sector sizes on your physical disks will remain the same. A sector is the smallest physical storage unit on a disk. The default sector size is 512 B since it is the most common sector size in disks today.

[Adding Spare Disks](#)

Spare disks are physical disks that will immediately replace critical disks in an array.

The screenshot shows the HighPoint Technologies, Inc. WebGUI interface. At the top, there's a dropdown for 'Controller(1): 4520'. Below it is a navigation bar with tabs: Global View, Physical, Logical (selected), Setting, Event, SHI, Recover, Logout, and Help. On the left side, there's a sidebar with links: Create Array, Spare Pool (selected), Logical Device, Rescan, and Beeper Mute. The main content area is divided into two sections: 'Spare Pool' and 'Available Disks'. The 'Spare Pool' section has a 'Remove Spare' button. The 'Available Disks' section contains a table with four rows of disk information, each with a checkbox for selection.

Spare Pool			
☐ Remove Spare			
Available Disks			
☐	Device_1_1	WDC WD40EFRX-68WT0N0-WD-WCC4ENSLV3U6	4.00 TB
☐	Device_1_2	WDC WD60EFRX-68MYMN1-WD-WX11D74RHV7A	6.00 TB
☐	Device_1_3	WDC WD30EFRX-68EUZN0-WD-WMC4N0DCFMUT	3.00 TB
☐	Device_1_4	WDC WD40EFRX-68WT0N0-WD-WCC4EHYCFZXL	4.00 TB
Add Spare			

To add spare disks:

1. Log in WebGUI
2. Click **Logical**
3. Click **Spare Pool**
4. Check the box for the disk you want as a spare from **Available Disks**
5. Click **Add Spare**

Disks added to the spare pool will show under **Spare Pool** and can be removed by checking the disk checkbox from **Spare Pool** > Click **Remove Spare**

Physical drives marked as a spare will automatically be added to an array whenever there is a disk failure. Having this feature minimizes the chances of a data loss by reducing the time an array is in critical status.

[Obtaining Logical Device Information](#)

Logical device tab is the default page upon clicking the Logical tab of the WebGUI. This page contains information about your RAID arrays and individual disks your system detects.

Logical Device Information

Arrays you create and the properties associated with them will appear here.

Maintenance

Once an array has been created, you have the option maintain it.

Array Information

Clicking on the maintenance button will show you the Array information box. Different array statuses (Normal, critical, disabled) will have different maintenance options.

Normal Status

The screenshot displays the 'Logical Device Information' window. At the top, a table lists the RAID array 'RAID_5_0' with details: Type (RAID 5), Capacity (9.00 TB), BlockSize (64k), SectorSize (512B), OS Name (HPT DISK 0_0), and Status (Normal). A 'Maintenance' link is visible next to the status. Below this, an 'Array Information' dialog box is open, showing a tree view of the RAID array and its constituent devices (Device_1_1 through Device_1_4). The dialog box contains several maintenance options: Delete, Unplug, Verify, Write Back (toggle), Change Cache Policy, Disable (toggle), Change Margin, Rename, JBOD(Volume) (toggle), and ORLM. A 'Close' button is at the bottom right of the dialog.

Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
RAID_5_0	RAID 5	9.00 TB	64k	512B	HPT DISK 0_0	Normal

Location	Model	Capacity	Max Free
1/1	WDC WD40	TB	1.00 TB
1/2	WDC WD60	TB	3.00 TB
1/3	WDC WD30	TB	0.00 GB
1/4	WDC WD40	TB	1.00 TB

A Normal Status Array has the following options

- Delete
- Unplug
- Verify
- Change Cache Policy
- Change Margin
- Rename
- ORLM

Delete - deletes the selected RAID array

Unplug - powers off the selected RAID array

Verify - verifies the integrity of the RAID array

Change Cache Policy - Toggles between Write through and Write back cache

Change Margin - Adjust margin when DV mode is enabled

Rename - renames the RAID array

OCE/ORLM - Online Capacity Expansion / Online RAID Level Migration

Critical Status

Logical Device Information

Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
RAID_5_0	RAID 5	9.00 TB	64k	512B	HPT DISK 0_0	Critical Maintenance

Array Information

Location	Model	Device	Capacity	Max Free
1/1	WDC WD40	Device_1_1	TB	1.00 TB
1/2	WDC WD60	Device_1_2	TB	3.00 TB
1/3	WDC WD30	Device_1_3	TB	0.00 GB
1/4	WDC WD40	Device_1_4	TB	1.00 TB

Buttons: Delete, Unplug, Add Disk, Write Back, Change Cache Policy, Disable, Change Margin, JBOD(Volume), ORLM, Close

A critical status array has all the normal status options except the following:

- The Array can no longer be renamed
- **Add disk** replaces the **verify disk** option

Once array status changes to critical, the faulty disk will be taken offline and you can either:

- Reinsert the same disk
- Insert new disk

Reinserting the same disk should trigger rebuilding status, since data on the disk would be recognized.

If you insert a new disk, clicking **add disk** will give you the option to select that disk and add it to the array.

Disabled Status

Logical Device Information						
Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status
 RAID_5_0	RAID 5	9.00 TB	64k	512B		Disabled Maintenance

Array Information			
RAID_5_0			
Location	Model		
 1/1	WDC WD40	 Device_1_1	Delete Unplug Recover Close
 1/2	WDC WD60	 Device_1_2	
 1/3	WDC WD30	 Device_1_3	
 1/4	WDC WD40	 Device_1_4	

	Capacity	Max Free
 1/1	4.00 TB	1.00 TB
 1/2	6.00 TB	3.00 TB
 1/3	3.00 TB	0.00 GB
 1/4	4.00 TB	1.00 TB

A disabled status array means that your RAID level does not have enough disks to function.

- Your data will be inaccessible
- Rebuilding will not trigger, since RAID does not have enough parity data to rebuild upon

Your options in Maintenance are:

- Delete
- Unplug
- Recover

Delete - will delete the array

Unplug - will take array offline, making it safe to remove

Recover - will attempt to recover the array using the list from the recover tab

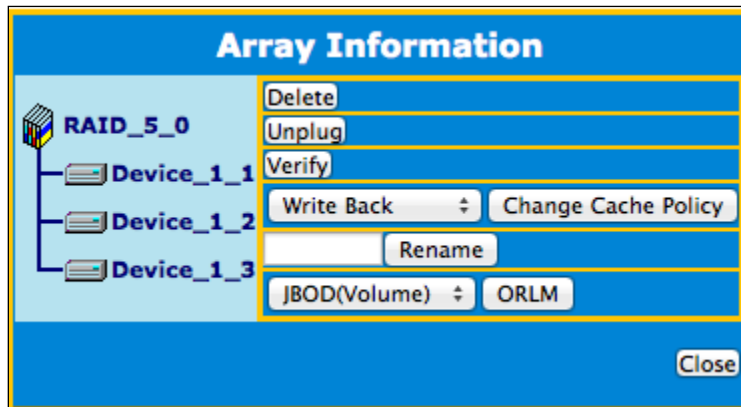
Expanding an Existing Array

Important: It is recommended to **Verify/Rebuild** your array before **Expanding** or **Migrating**. Once you start an **OCE/ORLM** procedure, you *can* stop the process but it **must** be resumed until completion.

To add more capacity to your current configuration follow these steps:

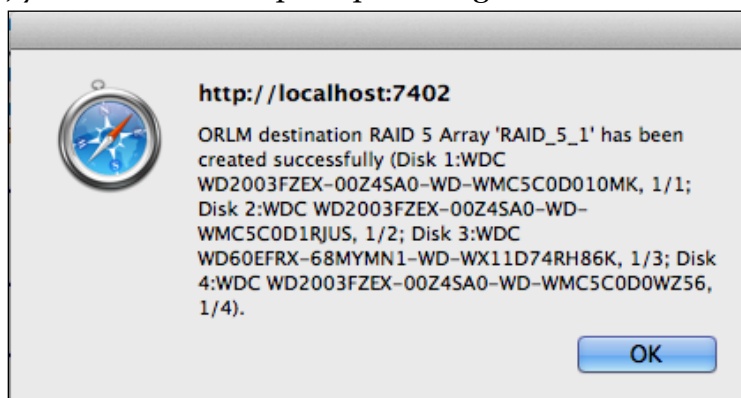
1. Log in WebGUI
2. Select desired controller from drop down menu on top left
3. Click **Logical**
4. Click **Maintenance** for the array you want to change

- Select a **different** RAID level to **Migrate**
- Select the **same** RAID level to **Expand**



5. **Important:** Record all the physical drives currently in array.
6. Click **ORLM**
7. Select the physical drives you recorded earlier and the drives you want to add
8. Click **Submit**

Upon submission, you will receive a prompt stating ORLM created successfully.



The **Logical Device Information** will change status to **migrating**.

Physical Device Information

Controller(1): 4520

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Global View Physical **Logical** Setting Event SHI Recover Logout Help

Create Array
Spare Pool
Logical Device
Rescan
Beeper Mute

Logical Device Information							
Name	Type	Capacity	BlockSize	SectorSize	OS Name	Status	
 RAID_5_0	RAID 5	4.00 TB	64k	512B	HPT DISK 1_3	Migrating 0%	Maintenance
 RAID_5_1	RAID 5	6.00 TB	64k	512B		Migrating 0%	Maintenance
 Device_1_6	Hard Disk	6.00 TB			HPT DISK 1_0	Legacy	
 Device_1_7	Hard Disk	6.00 TB			HPT DISK 1_1	Legacy	
 Device_1_8	Hard Disk	6.00 TB			HPT DISK 1_2	Legacy	

- **Location** – which controller and port the drive is located in
- **Model** – model number of the drive connected
- **Capacity** – total capacity of the drive
- **Max Free** – total capacity that is not configured

Rescan

Clicking rescan will force drivers to report array status. For any disk(s) you hot plug into the device, do not click rescan until all physical drives are detected and appear under Logical Device Information.

Beeper Mute

The controller emits a beeping sound whenever an

- Array falls into **critical** status
- Array falls into **disabled** status
- You unplug a disk
- Your disk fails due to bad sectors
- SMART sensors anticipate drive failure

If device is currently beeping, clicking Beeper Mute will mute the sound immediately.

Note: This button does not permanently mute the alarm. In order to permanently mute the alarm, go to **Setting > Enable audible alarm > Disabled**.

Setting Tab

Controller(1): 4520



Global ViewPhysicalLogical**Setting**EventSHIRecoverLogoutHelp

System

Email

System Setting

Enable auto rebuild.

Disabled

Enable Continue Rebuilding on error.

Disabled

Enable audible alarm.

Disabled

Set Spindown Idle Disk(minutes):

Disabled

Restrict to localhost access.

Disabled

Set Rebuild Priority:

Medium

Port Number:

7402

Submit

Password Setting

Password:

Confirm:

Submit

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Under this tab, user can

- Enable auto-rebuilding
- Enable rebuilding on error
- Turn audible alarm on/off
- Set spindown time for idle disks
- Restrict to localhost
- Set rebuild priority
- Change port number
- Change WebGUI password

System Settings

Enable auto rebuild (default: Enabled)

When a physical drive fails, the controller will take the drive offline. Once you re-insert or replace the disk, the controller will not automatically rebuild the array unless this option is enabled.

Enable continue rebuilding on error (default: Enabled)

When enabled, the rebuilding process will ignore bad disk sectors and continue rebuilding until completion. When rebuild is finished, the data may be accessible but data inconsistency due to ignored bad sectors may cause problems in the future. If this option is enabled, HighPoint recommends user to check the event log for bad sectors.

Enable audible alarm (default: Enabled)

When a physical disk fails, the controller will emit an audible sound signaling failure. This option mutes the alarm.

Set Spindown Idle Disk (minutes) (default: Disabled)

When set, physical drives will spindown a certain amount of time after disk activity ceases. Only 10, 20, 30, 60, 120, 180, 240 minutes setting are available.

Restrict to localhost access (default: Enabled)

Remote access to the controller will be restricted when **enabled**, other users in your network will be unable to remotely log in to the WebGUI.

Rebuild Priority (default: Medium)

You can specify the amount of system resources you want to dedicate to rebuilding the array. There are 5 levels of priority [Lowest, Low, Medium, High, Highest]

Port Number (default: 7402)

The default port that the HighPoint WebGUI listens on is 7402. You may change it to any open port.

[Password Setting](#)

[Changing your WebGUI password](#)

Under Password Setting type your new password and confirm it, then click submit.

[Recovering your WebGUI password](#)

If you wish to revert to the default password: hpt, delete the file hptuser.dat.

For **Mac** Users:

1. Open **Terminal**
2. Type or navigate to `cd /usr/share/hpt`
3. Type `rm hptuser.dat`, to remove the file
4. Reboot

For **Windows** Users:

1. Open file explorer
2. Navigate to **C:/Windows/**
3. Delete **hptuser.dat**
4. Reboot

[Email Setting](#)

The following topics are covered under email:

- SMTP Setting
- Adding Recipients

You can set the controller to send an email out to recipients of your choosing when certain events (refer to Event Tab) trigger.

SMTP settings

SMTP Setting	
☒ Enable Event Notification	
Server Address (name or IP):	
Mail From (E-mail address):	
Login Name:	
Password:	
SMTP Port:	
Support SSL:	☒
Change Setting	

To set up email alerts:

1. Check the Enable Event Notification box.
2. Enter the ISP server address name or SMTP name
3. Type in the email address of the **sender** (email account that is going to **send** the alert)
4. Type in the account name and password of the sender
5. Type in the SMTP port (default: 25)
6. Check support SSL box if SSL is supported by your ISP (port value will change to 465).

Note: After you click 'Change Setting' the password box will become blank.

How to Add Recipients

Recipients		
E-mail	Name	Event Level
Add Recipient		
E-mail:		
Name:		
Event Level:	☐ Information ☐ Warning ☐ Error	
Add Test		

You can add multiple email addresses as receivers of a notice.

1. Type the email of the recipient in the **E-mail** text box
2. Type the name of the recipient in the **Name** text box
3. Check which type(s) of events will trigger an email in the respective **Event Level** check boxes
4. **(Optional)** Click **test** to confirm settings are correct by sending out a test email
5. Click **add** to add the recipient to recipient list

6. The added recipient will display in under **Recipients**

The email will send to your recipients the output recorded in the event log.

Example email message:

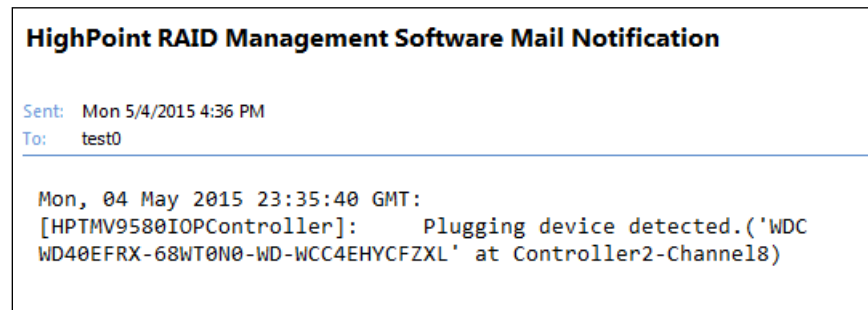
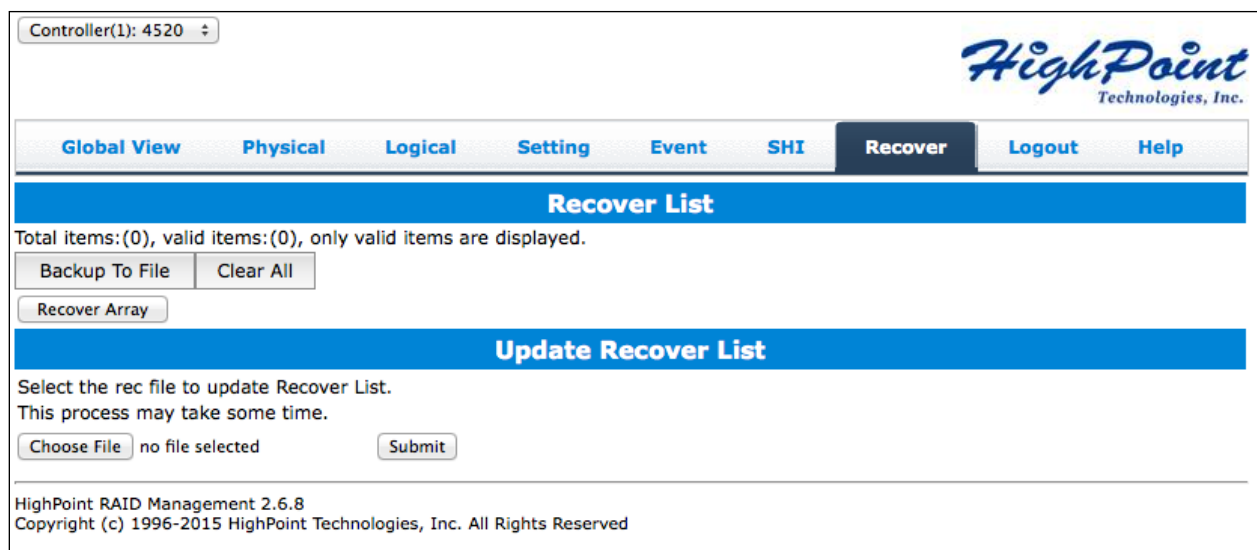


Figure 10. Example event log email

Recover Tab



Previously created arrays will be stored under this tab. Recovering an array from here will attempt to recover a **'disabled'** array and make it **'normal'**.

The Recover List will list all your previous and current created arrays. Each entry will list the following properties:

- Array name
- RAID level
- Array Capacity

- Time created (YYYY/MM/DD, HH/MM/SS, 24 hr clock format)
- Location of physical drives
- Model of physical drives

Important: When recovering an array it is important to note the **location** and **model** of each physical drive because you can **only** recover using those **exact** positions and drive model.

How to Backup your Recover List

The recover list is a record of your previously created arrays containing the model and location information of your physical drives. Recovering from the list could help bring a **disabled** array back to **normal** status for emergency data retrieval.

To backup your recover list:

1. Log in to WebGUI
2. Click **Recover** Tab
3. Click **Backup to File**
Note: The file will be saved as **hptrec.rec**

How to Reload your Backup Recover List

In the case that you cleared the recover list or it does not appear for any reason, you can recover it if you saved the list beforehand.

To reload your recover list

1. Log in to WebGUI
2. Click **Recover** Tab
3. Under **Update Recover List** click **Browse**
4. Locate your previously saved **hptrec.rec** file and select it
Note: loading a back up recover list will completely replace the current recover list.
5. Click **Submit**

Event Tab

In the event tab, you can see log entries associated with the HighPoint device. The event log provides useful information when troubleshooting your set up.

In the event tab, there are four options available:

- Download – save the log file on your computer

- Clear – clears all log entries
- Prev – view previous log page
- Next – view next log page

[Table 3. Event Log Icon Guide](#)

Icon	Name	Definition
	Information	Includes general administrative tasks: • Create/delete arrays • Configuring spares • Rebuilding arrays • Configuring event notifications • Configuring maintenance
	Warning	Alerts issued by the Host Adapter: • High temperatures • Sector errors • Communication errors • Verification errors
	Error	Hardware related problems • Hard disk failure • Broken errors • Memory failure

The event view is a basic error logging tool built into the HighPoint WebGUI.

[SHI \(Storage Health Inspector\)](#)

- S.M.A.R.T Attributes
- HDD Temperature Threshold
- Storage Health Inspector Scheduling

The SHI outputs information collected using SMART (Self-Monitoring Analysis and Reporting Technology) Hard Drive Technology. The data provided on this tab helps you to anticipate any disk failures based on a variety of monitored hard disk properties.

How to Enable SMART Monitoring

Controller(1): 4520

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Global View Physical Logical Setting Event **SHI** Recover Logout Help

[Schedule](#)

Storage Health Inspector(SHI)

Controller ID	Port#	Device Serial Number	RAID	°F	Bad Sectors Found & Repaired	Device Status	
1	5	WD-WCC4ENSLV3U6	RAID_0_1	105	None	OK	SMART
1	6	WD-WX11D74RHV7A	RAID_0_1	105	None	OK	SMART
1	7	WD-WMC4N0DCFMUT	RAID_0_1	102	None	OK	SMART
1	8	WD-WCC4EHYCFZXL	RAID_0_1	105	None	OK	SMART

HDD Temperature Threshold

Set harddisk temperature threshold (F):

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To access SMART attributes of an individual disk:

1. Log in to WebGUI (**default user:** RAID **password:** hpt)
2. Select the proper controller using the drop down menu on the top left
3. Click the **SHI** tab
4. Click **SMART** on the desired disk
5. Click **Enable** to enable SMART monitoring

Disabling SMART monitoring

You have the option the disable SMART monitoring on each individual disk.
To disable:

1. Select the proper controller using the drop down menu on the top left
2. Click the **SHI** tab
3. Click **SMART** on desired disk
4. Click **Disable**

Note: Disabling SMART will prompt the Storage Health Inspector to change the disk status to 'Failed'. The alarm will **not** alert you when this setting is changed. And any potential warnings due to S.M.A.R.T attribute technology will not

How to Change HDD Temperature Threshold

To ensure hard disk temperatures remain cool, enable SMART to monitor disk temperatures. In **SHI**, you can set a threshold so that the WebGUI or controller alarm (if enabled) can warn you when physical disks get too hot.

1. Log in to WebGUI
2. Select the controller from the drop down on the top left
3. Click **SHI**
4. Type the desired hddisk temperature threshold (°F)
5. Click **Set**

How to Use the Health Inspector Scheduler

The screenshot displays the HighPoint RAID Management WebGUI interface. At the top, a dropdown menu shows 'Controller(1): 4520'. The navigation bar includes tabs for 'Global View', 'Physical', 'Logical' (selected), 'Setting', 'Event', 'SHI', 'Recover', 'Logout', and 'Help'. The 'SHI' logo is visible in the top right corner.

The main content area is divided into three sections:

- Tasks List:** A table with columns 'Name' and 'Description'. It lists a task named 'test0' with the description 'Check all disks every week on Tuesday at 16:20:0'. A 'Delete' button is next to the task name.
- New Verify Task:** A form for creating a new task. It includes a radio button for 'RAID_5_1', a 'Task Name' input field, and a 'Schedule' section. The 'Schedule' section has two options: 'Occurs one time on' (selected) with a date/time picker set to '2015-5-5 at 0:0:0', and 'Occurs every' with a frequency of '4 Month(s)' on 'Tuesday' at '12:0:0'. There are also 'Start date' and 'End date' pickers, with 'No end date' selected.
- Health Inspector Scheduler:** A form for scheduling health inspections. It includes a 'Task Name' input field, a 'Select a Schedule' section with radio buttons for 'Daily', 'Weekly' (selected), 'Bi-Weekly', and 'Monthly', and a 'Select a time' section with a dropdown for 'Sunday' and a time picker set to '1:0:0:0'.

At the bottom, there is a 'Submit' button for the 'Health Inspector Scheduler' section. The footer text reads: 'HighPoint RAID Management 2.6.8 Copyright (c) 1996-2015 HighPoint Technologies, Inc. All Rights Reserved'.

The **Health Inspector Scheduler (HIS)** enables you to schedule disk/array checkups to ensure disks/array are functioning optimally.

How to Create a New Verify Task

All arrays will appear under New Verify Task

1. Log in to WebGUI
2. Select the proper controller from the top left drop down
3. Click **SHI**
4. Click **Schedule**
5. Select the array you want to schedule the verify task
6. Type the name in **Task Name** entry box
7. Choose whether you want to schedule
 - One time verify task on specific date (YYYY-MM-DD) at (HH:MM:SS, 24-hr clock)
 - Or a specific schedule you can adjust based on Daily, Weekly, or Monthly options
8. Click **Submit**
9. Your entry will appear under **Tasks List**

Note: New Verify Task box only appears if you have normal status arrays. If you have a critical array, New Rebuild Task will replace New Verify Task.

Section 6: Formatting the RAID Volumes

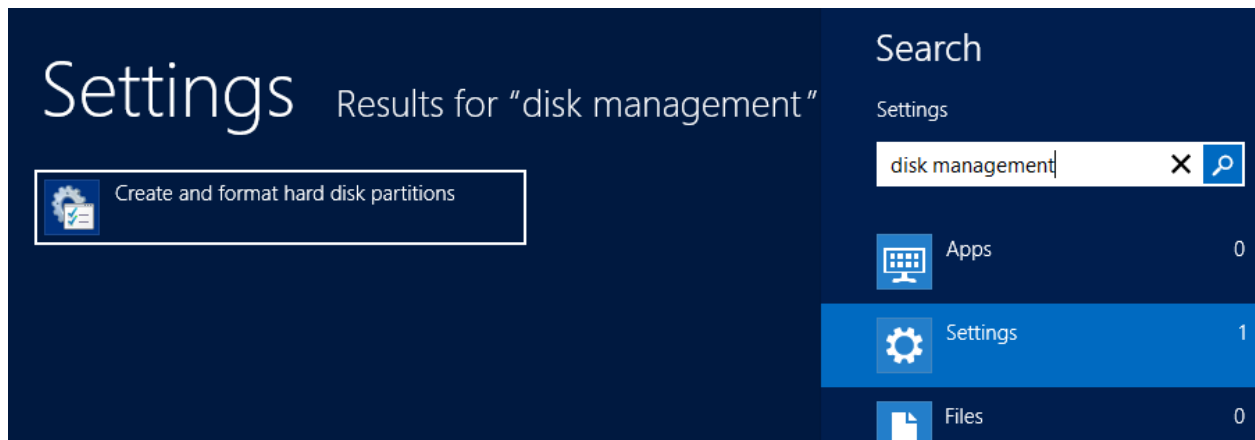
After creating a RAID array (see **page 42**), your operating system will recognize that array as a logical disk. But it will not be accessible until it is formatted by the operating system.

Format the volume when you have finished the following procedures:

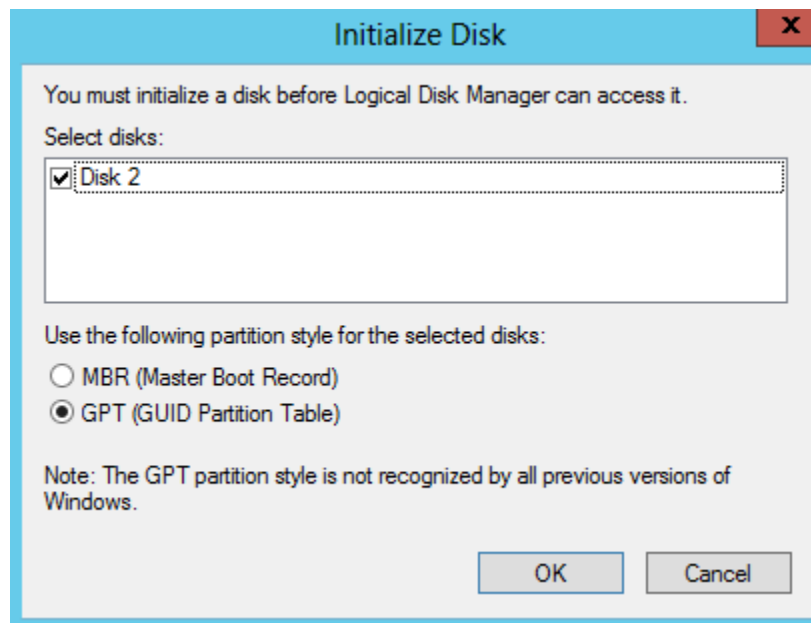
- Set up the Enclosure
- Set up the RAID Controller
- Installed Drivers
- Created an Array

For **Windows** Users:

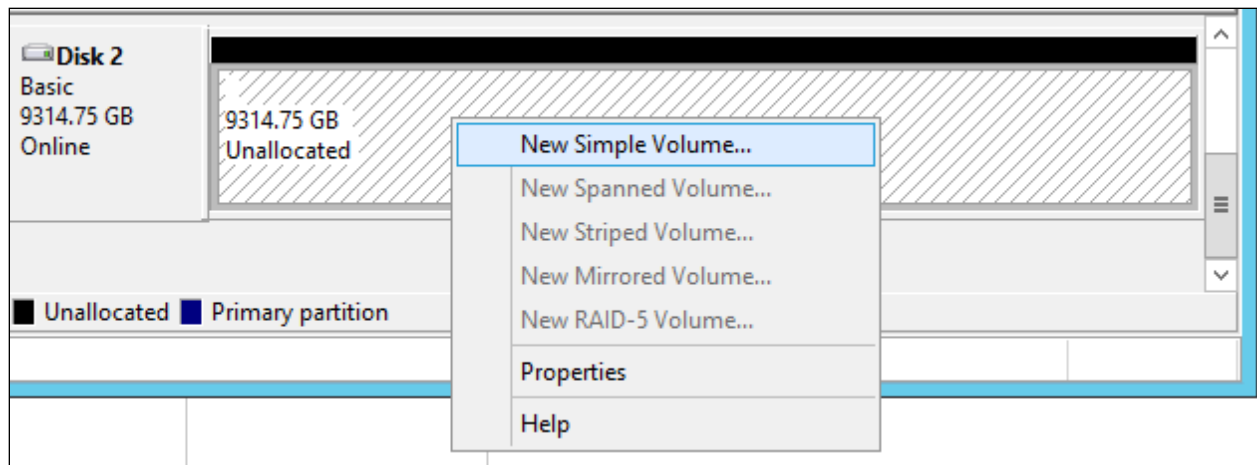
1. Use Windows Search Box and search **Disk Management**. (Search results may show **Create and format hard disk partitions**)



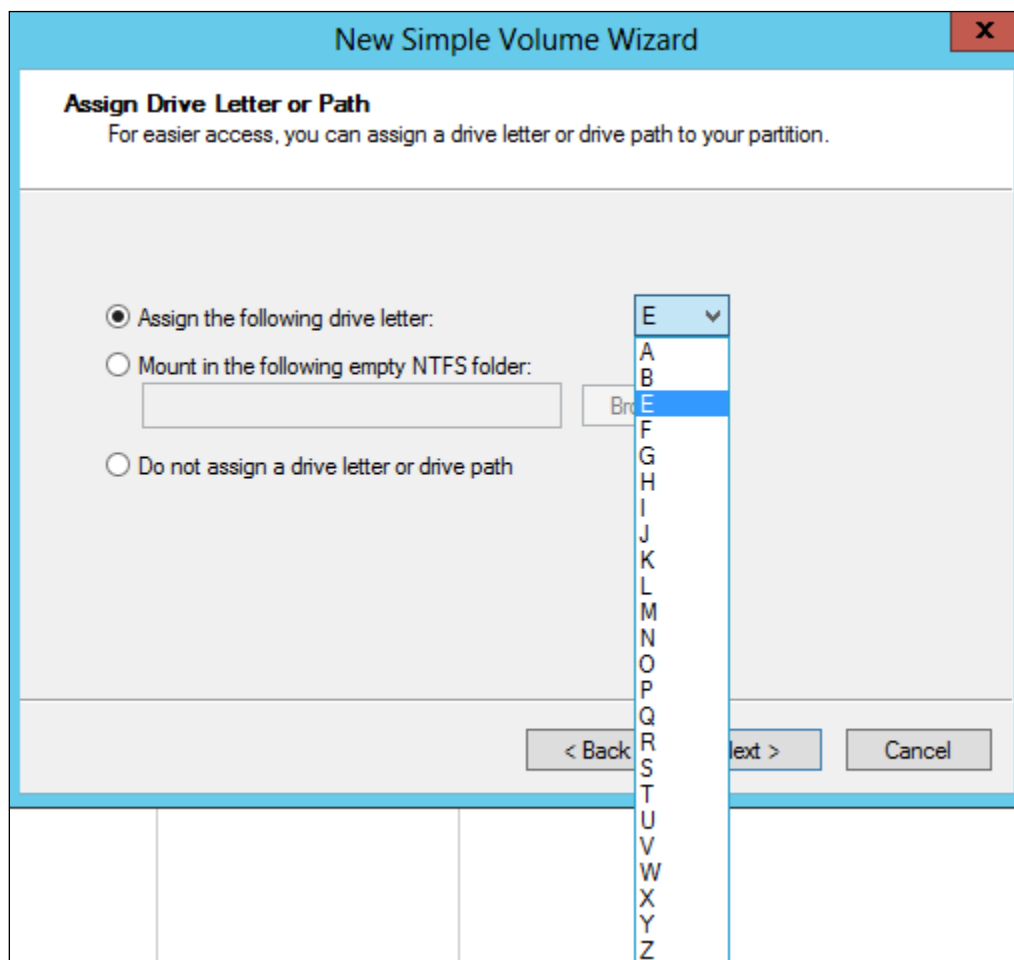
2. Alternatively, Go to **Control Panel**
3. Under Administrative Tools, click **Create and format hard disk partitions**
 - If you just created the array, a prompt will appear after clicking disk management asking you to initialize the disk
 - MBR partition table is mainly for bootable drives and has a 2 TB limit. If your PC motherboard uses legacy BIOS, you will most likely need to use MBR for bootable drives.
 - GPT partition table has no capacity limit, but cannot be bootable unless your PC motherboard contains UEFI firmware.



4. Once initialized, right click the unallocated disk space for your disk
5. click **New Simple Volume**



6. Follow the instructions on screen to receive a drive letter



7. Once finished, the drive will appear in your OS with the letter you assigned

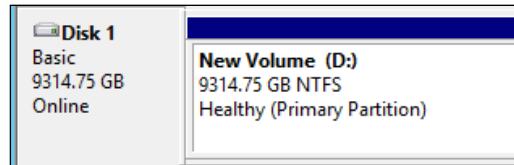
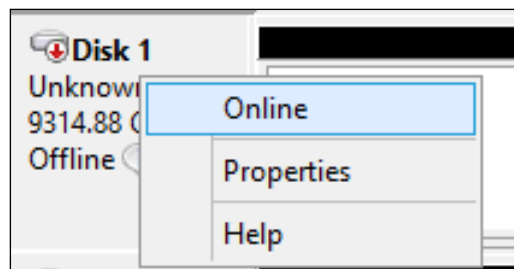


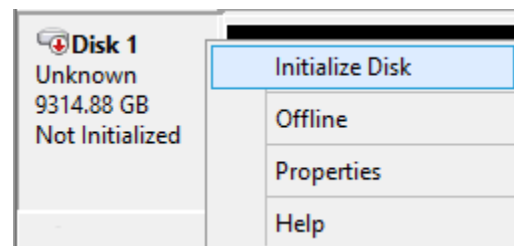
Figure 11. Disk formatted as NTFS and assigned drive letter D:

Your disk may initially appear offline to the operating system, and you may have to bring it online:

1. In Disk Management, right click the disk you wish to bring online.

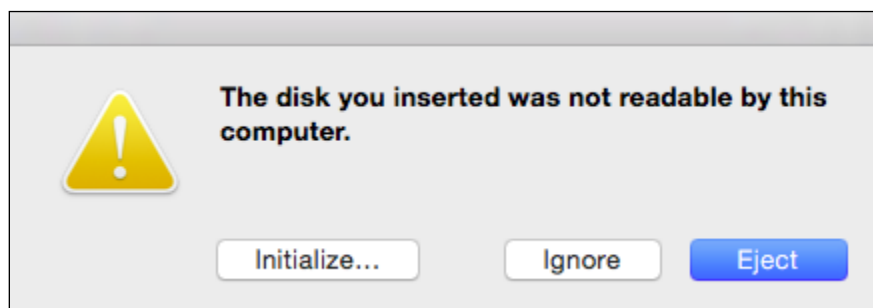


2. The disk status will change to Not Initialized; right click the disk again to initialize it.

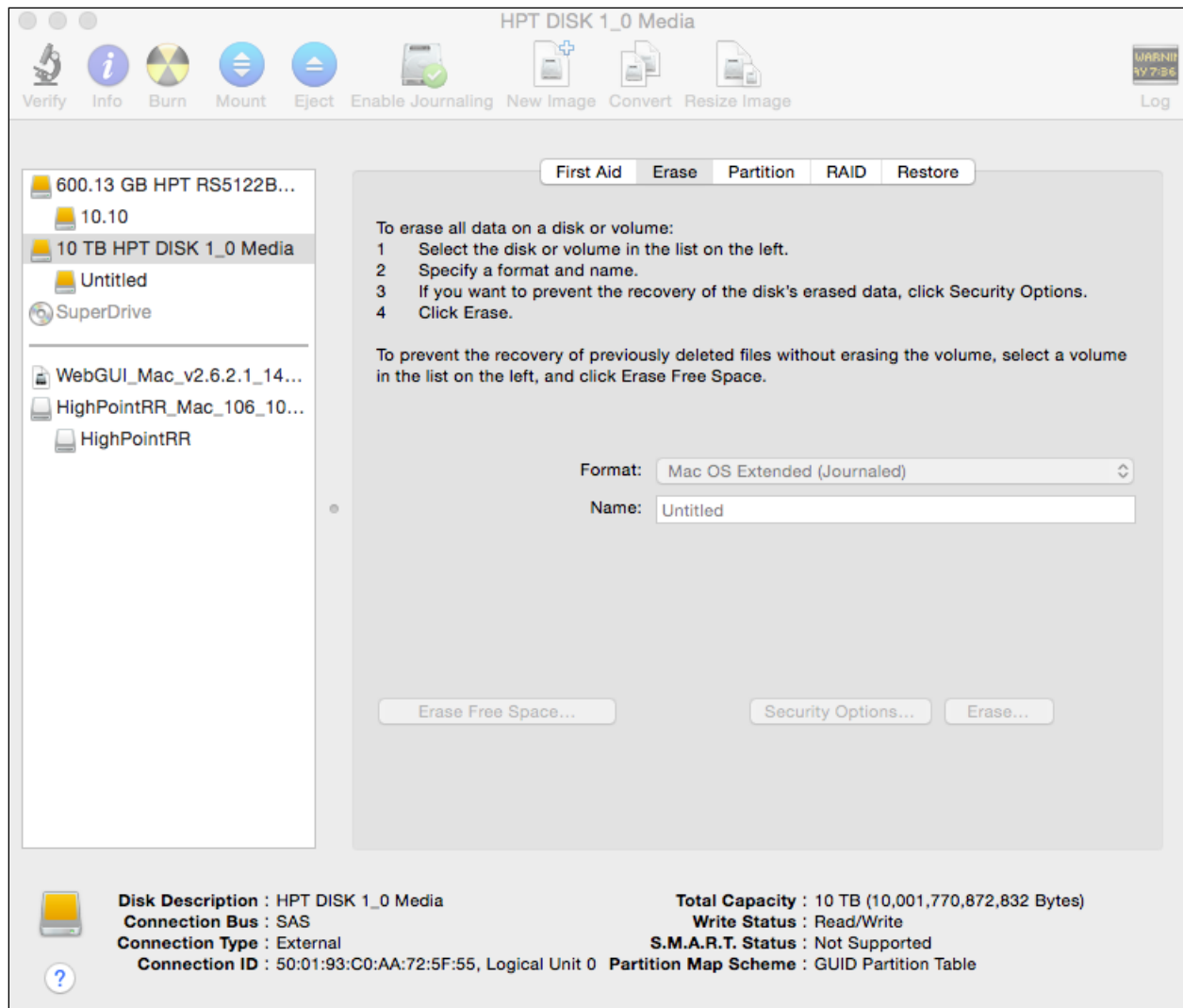


For **Mac** Users:

1. After creating an array using the WebGUI, you will be prompted to **initialize**.



2. Click **Initialize** (this will simply open **Disk Utility**)
3. Select your newly created array
4. Click **Erase**
5. Select a Format (recommended Mac OS Extended (Journaled))
6. Choose a **name** for your RAID volume
7. Click **Erase...**



8. The Volume will appear on your desktop



Section 7: Troubleshooting

This section provides guidelines to some problems you may encounter:

- Handling Critical Arrays
- Handling Disabled Arrays
- PC hangs when card is installed.

Handling Critical Arrays

When your disk status turns critical, that means your array as a whole is still accessible, but a disk or two is faulty (depending on your RAID level) is in danger of failing.

Common scenarios for critical status

- Unplugging disk that is part of an array
 - Bad sector detected on a disk part of the array
 - Unrecoverable data during rebuilding
 - Defective port or cable interrupts rebuilding process
-

To recover from this situation,

1. Backup your existing data.
2. Identify which disk is faulty.
 - You can refer to the LED lights on the enclosure
 - Refer to the WebGUI Logical tab and Event tab.
3. Re-insert the faulty disk or replace with a new disk.
 - Array will rebuild automatically if your auto-rebuild setting is enabled and you reseated the faulty disk. **Note:** Click **Rescan** if array still does not rebuild automatically.
4. If the new disk is added and it does not automatically start rebuilding, you can manually add the disk in maintenance.
 - Log in to WebGUI
 - Click **Logical** Tab
 - Click **Maintenance** > **Add disk** > select the appropriate disk
5. Rebuild should now start.
 - If rebuild does not start, click 'Rescan' on the left hand panel.

Note: Rebuilding an array takes on average 2 hours per 1 Terabyte of disk capacity. The process will scan through the entire disk, even if you have very little *used* disk space.

Rebuilding Stops Due to Bad Sectors

If rebuilding fails to complete due to bad disk sector errors (check in the Event Log), there is an option to continue rebuilding on error in HighPoint WebGUI.

1. Log in to WebGUI
2. Click **Setting** tab
3. Under **System Setting**, change **Enable Continue Rebuilding on Error** to **Enabled**

This option will enable rebuilding to ignore bad sectors and attempt to make your data accessible. It is important to backup immediately after backup is complete and replace or repair the disks with bad sectors.

Critical array becomes disabled when you removed faulty disk

If this is the case, you may have removed the wrong disk. When you remove the wrong disk from a critical array, the array status may become disabled. Data is inaccessible for disabled arrays, follow these steps to restore the previous state.

1. Shut down your PC
2. Shut down the RS6424TS Enclosure
3. Place all disks back to original configuration
4. Boot up PC

Your array should be back to Critical status. Identify the correct disk and rebuild from there.

Handling Disabled Arrays

If two or more disks in your array go offline due to an error or physical disconnection your array will become **disabled**.

Disabled arrays are difficult to recover, so it is important to fix any critical status as soon as possible.

To recover a disabled array, using the 'Recover Tab' will yield the best results. To utilize the **Recover** tab, you will need to insert the **exact** physical drives that are listed under the *recover list*.

How to recover from a Disabled Array

1. Log in to WebGUI
2. Click **Maintenance** for the array that is disabled
3. Click **Recover**

Alternatively:

1. Log in to WebGUI
2. Click **Maintenance** for the array that is disabled
3. Click **delete**
4. Click **Recover** Tab
5. Select the RAID configuration you want to recover
6. Click **Recover Array**

Your PC hangs when card is installed

The moment you power on your PC the system BIOS will load and your PC will enter POST (Power On Self Test). If you hang at this screen it may be a system resources issue.

There are two methods to fix this problem.

1. Update your motherboard BIOS
2. Update your RAID Controller BIOS

Update your motherboard BIOS

To update your motherboard BIOS, refer to your motherboard manufacturer's user manual or website.

Update your RocketRAID BIOS

To update RocketRAID BIOS refer to either of these sections

- Using a Bootable USB to update BIOS
- Updating the BIOS through WebGUI **Note:** Press END to bypass the RocketRAID BIOS splash screen so you can boot up windows and access WebGUI.

Online Array Roaming

One of the features of all HighPoint RAID controllers is online array roaming. Information about the RAID configuration is stored on the physical drives. So if a card fails or you wish to switch cards, the RAID configuration data can still be read by another HighPoint card.

Help

- Online Help
- Register Product

Online Help redirects you to additional documentation concerning the HighPoint WebGUI.

Register Product takes you to HighPoint's web support. On this page you can create a new customer profile where you can register your product or post an online support ticket.

Table 4. WebGUI Icon Guide

	Critical – missing disk A disk is missing from the array bringing it to ‘critical’ status. The array is still accessible but another disk failure could result in data loss.
	Verifying The array is currently running a disk integrity check.
	Rebuilding The array is currently rebuilding meaning you replaced a failed disk or added a new disk to a ‘critical’ state array.
	Critical – rebuild required The array has all disks, but one disk requires rebuilding.
	Disabled The icon represents a disabled array, meaning more than one disk failed and the array is no longer accessible
	Initializing The array is initializing. The two types of initialization is Foreground and Background. (See Initialization)
	Uninitialized The array initialization process has been interrupted, and the process is incomplete.
	Not Initialized Disk is not initialized yet, and needs to be initialized before use
	OCE/ORLM Array is performing a OCE/ORLM operation
	OCE/ORLM has stopped The array expansion process has been stopped.
	Legacy An existing file system has been detected on the disk. These disk are classified as legacy drives.
	Spare The device is a spare drive, it will automatically replace any failed drive part of an array.
	Normal The array status is normal
Initializing	

	The array is initializing, either foreground or background initialization
	Initialization Stopped The initialization has been stopped. Current status is uninitialized.
	Critical - Inconsistency Data in the array is inconsistent and needs to be rebuilt.
	Critical - missing disk A disk has been removed or experienced failure, and user needs to reinsert disk or add a new disk.
	Rebuilding The array is currently rebuilding.
	Verifying The array is performing a data consistency check. Array status will show 'verifying'.
	Disabled The array does not have enough disks to maintain the RAID level. A disabled array is not accessible.
	OCE/ORLM Array is expanding its capacity or migrating to a different raid level. Status will display 'Expanding/Migrating'
	OCE/ORLM stopped The 'Expansion/Migrating' process has been stopped. The status will display 'Need Expanding/Migrating'
	Critical - OCE/ORLM A disk member is lost during the OCE/ORLM process.
	Critical - OCE/ORLM - rebuild The expanding/migrating array requires a rebuild.

Table 5. RAID Level Quick Reference

Type	Description	Min. disks	Usable space	Advantage	Disadvantage	Application
JBOD	Just a bunch of disk	1	100%	Each drive can be accessed as a single volume	No fault tolerance - failure of one drive results in complete data loss	Backup
RAID 0	Disk Striping	2	100%	Offers the highest performance	No fault tolerance - failure of one drive in the array results in complete data lose	Temporary file, performance driven application.
RAID 1	Disk Mirroring	2	50%	Provides convenient low-cost data redundancy for smaller systems and servers	Useable storage space is 50% of total available capacity. Can handle 1 disk failure.	Operating system, backup, and transaction database.
RAID 10	Disk Mirroring followed by stripe	4	50%	High read performance and medium write performance with data protection for up to 2-drive failures	Useable storage capacity equals total capacity of all drives in the array minus two	Fast database and application servers which need performance and data protection
RAID 5	Disk Striping with Rotating parity	3	67-94%	High read performance, and medium write performance with data protection with a single drive failure	Not recommended for database applications that require frequent/heavy write sessions. Can handle 1 disk failure.	Data archives, and ideal for application that require data protection
RAID 6	Disk Striping with dual rotating parity	4	50-88%	High read performance, and medium write performance with data protection in case of up to two drives failure	Not recommended for applications that require frequent/heavy write sessions.	Data archives and ideal for application that requires data protection

HighPoint Recommended List of Hard Drives

HighPoint maintains a list of tested hard drives suitable for RAID applications. Since not every hard drive in the market can be tested, this list is meant to be a general guideline for selecting hard drives operating in a RAID environment. Regular, desktop grade drives are highly not recommended for RAID use.

http://highpoint-tech.com/PDF/Compatibility_List/RocketRAID_600_2700_3600_and_4500_Series_RAID_HBA_Hard_Drive_Compatibility_List.pdf

Contacting Technical Support

For any help and support, submit a support ticket online at <http://www.highpoint-tech.com/websupport/>.

You may also call us during our regular business hours:

Monday - Friday (Excluding Holidays), 9 AM to 6 PM

Phone: (408) 240-6108